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```
0000 1 .TITLE DQDRIVER - VAX/VMS RB730:RB02/RB80 DISK DRIVER
0000 2 .IDENT 'V04-000'
0000 3
0000 4 *****
0000 5
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0000 23
0000 24 *****
0000 25
0000 26
0000 27
0000 28 FACILITY:
0000 29
0000 30 VAX/VMS RB730:RB02/RB80 DISK DRIVER
0000 31
0000 32 AUTHOR:
0000 33
0000 34 G. ROBERT 21-JAN-1981
0000 35
0000 36 MODIFIED BY:
0000 37
0000 38 V03-008 RAS0300 Ron Schaefer 19-Jun-1984
0000 39 Add DEV$M_NNM characteristic to DECHAR2 so that these
0000 40 devices will have the 'node$' prefix.
0000 41
0000 42 V03-007 ROW0211 Ralph O. Weber 28-DEC-1983
0000 43 Change device-dependent UCB definition base from UCBSW_BCR+2
0000 44 to UCBSK_LCL_DISK_LENGTH.
0000 45
0000 46 V03-006 PRD0035 Paul R. DeStefano 09-Sep-1983
0000 47 Added EXESLCLDSKVALID to function decision table.
0000 48
0000 49 V03-005 PRD0026 Paul R. DeStefano 28-Jul-1983
0000 50 Modified ECC correction logic so that ECC is only applied
0000 51 when there is a single bit ECC correctable error, or if there
0000 52 is a multiple bit ECC correctable error and the error cannot
0000 53 be corrected using retries.
0000 54
0000 55 V03-004 PRD0025 Paul R. DeStefano 22-Jun-1983
0000 56 Modified FATALERR routine to return SSS_PARITY only for
0000 57 errors that possibly indicate bad media. All other error
```

DQDRIVER
V04-000

- VAX/VMS RB730:RB02/RB80 DISK DRIVER

G 12

15-SEP-1984 23:49:22 VAX/VMS Macro V04-00
5-SEP-1984 00:12:46 [DRIVER.SRC]DQDRIVER.MAR;1

Page 2
(1)

0000 58 :
0000 59 :
0000 60 :
0000 61 :
0000 62 :
0000 63 :
0000 64 :
0000 65 :
0000 66 :
0000 67 :
0000 68 :
0000 69 :
0000 70 :
0000 71 : **

conditions which formerly returned \$\$\$_PARITY now return
\$\$\$_CNTLERR.

V03-003 GRR3003 GREG ROBERT 16-SEP-1982
RECORD PREVIOUS DISK ADDRESS IN ERROR LOG BUFFERS.

V03-002 KDM0002 Kathleen D. Morse 28-Jun-1982
Added \$DYNDEF.

V03-001 KTA0100 Kerbey T. Altmann 07-Jun-1982
Add code to set UCBSL_MEDIA_ID.

```
0000 73 .SBTTL PROGRAM ABSTRACT
0000 74
0000 75 : ABSTRACT:
0000 76 :
0000 77 : THIS MODULE CONTAINS THE TABLES AND ROUTINES NECESSARY TO
0000 78 : PERFORM ALL DEVICE-DEPENDENT PROCESSING OF AN I/O REQUEST
0000 79 : FOR RB730:RB02/RB80 DISK TYPES ON A VAX/VMS SYSTEM.
0000 80 :
0000 81 : THE DISKS HAVE THE FOLLOWING PHYSICAL GEOMETRY:
0000 82 :
0000 83 :
0000 84 : # CYL          TRACKS/      SECTORS/      BYTES/      MAXIMUM
0000 85 :                   CYLINDER    TRACK        SECTOR      BLOCKS
0000 86 : RB02          512           2           40          256          20480
0000 87 : RB80          561          14           32          512          251328
0000 88 :
0000 89 : SINCE THE RB02 SECTOR SIZE IS ONLY 1/2 BLOCK, LOGICAL TO PHYSICAL
0000 90 : CONVERSION OF RB02 DISK ADDRESSES BY IOC$CVTLOGPHY IS DELAYED
0000 91 : UNTIL STARTIO IS CALLED, AND THE DISK ADDRESS IS DOUBLED PRIOR
0000 92 : TO CONVERSION.
0000 93 :
0000 94 : ON THE RB80, THE LAST SECTOR IN EVERY TRACK IS RESERVED FOR
0000 95 : "SKIP SECTORING", AND THE LAST TWO CYLINDERS ARE RESERVED
0000 96 : FOR FIELD SERVICE. THE USER AVAILABLE RB80 GEOMETRY IS THEREFORE:
0000 97 :
0000 98 : RB80          559           14           31          512          242606
0000 99 :
0000 100 :
0000 101 : THE CONTROLLER DOES NOT READ OR WRITE BEYOND THE END OF TRACK
0000 102 : (SPIRALLING), SO READ AND WRITE FUNCTIONS ARE BROKEN UP BY THIS
0000 103 : DRIVER INTO PARTIAL TRANSFERS TO THE END OF TRACK, FOLLOWED BY
0000 104 : AN EXPLICIT SEEK TO THE NEXT TRACK, THEN ANOTHER READ OR
0000 105 : WRITE FUNCTION UNTIL THE TOTAL DATA TRANSFER IS COMPLETE.
0000 106 : (TRACK TO TRACK SPIRALLING FOR R80'S, WITHIN A CYLINDER,
0000 107 : IS DONE INSIDE THE XFER ROUTINE BY WRITING THE DAR).
0000 108 :
0000 109 : THE IO$_INHSEEK MODIFIER IS IGNORED BY THIS DRIVER.
0000 110 :
0000 111 : THE R02 DRIVE ON AN RB730 CONTROLLER IS CALLED AN RB02. THE
0000 112 : SAME DRIVE ON AN RL11 CONTROLLER IS KNOWN AS AN RL02. SIMILARLY
0000 113 : THE R80 DRIVE IS KNOWN AS THE RM80, RA80, AND RB80 WHEN PLACED
0000 114 : ON DIFFERENT CONTROLLERS. DRIVE DEPENDENT CHARACTERISTICS (SPEED,
0000 115 : SIZE, MECHANICAL TIMINGS) REMAIN THE SAME. CONTROLLER DEPENDENT
0000 116 : CHARACTERISTICS (COMMANDS, COMMAND TIMINGS, ERROR REPORTING) VARY
0000 117 : FROM CONTROLLER TO CONTROLLER.
0000 118 :
0000 119 :
0000 120 :--
```



```

0000 122      .SBTTL  EXTERNAL DEFINITIONS
0000 123
0000 124      :
0000 125      : EXTERNAL SYMBOLS
0000 126      :
0000 127
0000 128      $ADPDEF      ;DEFINE ADAPTER CONTROL BLOCK
0000 129      $CRBDEF      ;DEFINE CHANNEL REQUEST BLOCK
0000 130      $DCDEF       ;DEFINE DEVICE CLASS
0000 131      $DDBDEF      ;DEFINE DEVICE DATA BLOCK
0000 132      $DEVDEF      ;DEFINE DEVICE CHARACTERISTICS
0000 133      $DPTDEF      ;DEFINE DRIVER PROLOGUE TABLE
0000 134      $DYNDDEF     ;DEFINE DYNAMIC DATA STRUCTURE TYPES
0000 135      $EMBDEF      ;DEFINE ERROR MESSAGE BUFFER
0000 136      $IDBDEF      ;DEFINE INTERRUPT DATA BLOCK
0000 137      $IODEF       ;DEFINE I/O FUNCTION CODES
0000 138      $IPLDEF      ;DEFINE IPL CODES
0000 139      $IRPDEF      ;DEFINE I/O REQUEST PACKET
0000 140      $PRDEF       ;DEFINE PROCESSOR REGISTERS
0000 141      $SSDEF       ;DEFINE SYSTEM STATUS CODES
0000 142      $SUBIDEF     ;DEFINE UNIBUS ADAPTOR OFFSETS
0000 143      $UCBDEF      ;DEFINE UNIT CONTROL BLOCK
0000 144      $VECDEF      ;DEFINE INTERRUPT VECTOR BLOCK
0000 145

```

```
0000 147      .SBTTL  LOCAL MACRO DEFINITIONS
0000 148
0000 149      :
0000 150      : LOCAL MACROS
0000 151      :
0000 152      .MACRO  REQDPNRW
0000 153      JSB      G^IOCSREQDATAPNW
0000 154      .ENDM   REQDPNRW
0000 155
0000 156      .MACRO  LOADUBAA
0000 157      JSB      G^IOCSLOADUBAMAPA
0000 158      .ENDM   LOADUBAA
0000 159
0000 160      :
0000 161      : EXFUNCL
0000 162      : BRANCH TO SUBROUTINE WHICH REQUESTS CHANNEL (IF NOT ALREADY OWNED),
0000 163      : EXECUTES FCODE (OR R3) FUNCTION, AND BRANCHES TO BDST ON ERROR
0000 164      :
0000 165
0000 166      .MACRO  EXFUNCL  BDST,FCODE
0000 167      .IF  NB  FCODE      :IS FCODE NON-BLANK?
0000 168      MOVZBL  #CD'FCODE,R3  :IF NB - SPECIFY FCODE FUNCTION
0000 169      .ENDC      :IF B - SPECIFY FNTN IN EXISTING R3
0000 170      BSBW    FXL          :EXECUTE FUNCTION
0000 171      .BYTE   BDST-.-1    :WHERE TO GO IF ERROR
0000 172      .ENDM
0000 173
0000 174      :
0000 175      : GENF
0000 176      : GENERATE FUNCTION TABLE ENTRY AND CASE TABLE INDEX SYMBOL
0000 177      :
0000 178      .MACRO  GENF  FCODE,MODS
0000 179      CD'FCODE=-FTAB/4
0000 180      _TMP$VAL = FCODE
0000 181      _TMP$VAL = _TMP$VAL ! RB_CS_M_IE
0000 182      .IRP  MODBIT,MODS
0000 183      _TMP$VAL = _TMP$VAL ! RB_CS_M_'MODBIT'
0000 184      .ENDR
0000 185      .LONG   _TMP$VAL
0000 186      .ENDM
0000 187
0000 188
0000 189      :
0000 190      : CKPWR
0000 191      : DISABLE INTERRUPTS, CHECK IF POWER HAS FAILED,
0000 192      :
0000 193      .MACRO  CKPWR,DEST=RETREG,?L1
0000 194
0000 195      SETIPL  #IPL$ POWER      :RAISE TO POWER
0000 196      BBC    #UCB$V POWER,-  :IF CLR - NO POWER FAILURE
0000 197      UCB$W_STS(R5),L1      :
0000 198      ENBINT  :POWER FAILURE - RETURN TO SAVED IPL
0000 199      BRB    DEST          :EXIT
0000 200      L1:      :RETURN FOR NO POWER FAILURE
0000 201      .ENDM
0000 202
0000 203
```



```
0000 204 :  
0000 205 :GETUNIT  
0000 206 : GET UNIT NUMBER FROM UCB, PLACE IN SPECIFIED LOCATION OR  
0000 207 : R2 BY DEFAULT  
0000 208 :  
0000 209 :.MACRO GETUNIT,DEST=R2  
0000 210 :CLRL DEST ;CLEAR DEST FOR UNIT NUMBER  
0000 211 :INSV UCBSW_UNIT(R5), #8,#2,DEST ;PUT UNIT NUMBER IN DEST  
0000 212 :.ENDM  
0000 213 :  
0000 214 :  
0000 215 :  
0000 216 :INITIATE  
0000 217 : INITIATE A HARDWARE FUNCTION BY CLEARING CONTROLLER READY.  
0000 218 : PRESERVE THE ATTENTION AND INTERRUPT PENDING BITS BY CLEARING  
0000 219 : THEM (SINCE THEY ARE 'WRITE ONES TO CLEAR' THE FOLLOWING  
0000 220 : INSTRUCTION LEAVES THEM UNMODIFIED).  
0000 221 :  
0000 222 :.MACRO INITIATE  
0000 223 :BICL #RB_CS_M_CRDY- ;CLEAR CONTROLLER READY  
0000 224 :!RB_CS_M_ATN- ;...AND PRESERVE ATTENTION BITS  
0000 225 :!RB_CS_M_IR,- ;...AND INTERRUPT REQUEST BIT  
0000 226 :RB_CS(R4) ;...IN THE CSR  
0000 227 :.ENDM  
0000 228 :  
0000 229 :  
0000 230 :BDRVTYPE  
0000 231 : BRANCH ON DRIVE TYPE  
0000 232 :  
0000 233 :.MACRO BDRVTYPE TYPE,DEST  
0000 234 :CMPB #DTS_'TYPE,UCBSB_DEVTYPE(R5) ;COMPARE DRIVE TYPE  
0000 235 :BEQL DEST ;BRANCH IF SPECIFIED TYPE  
0000 236 :.ENDM  
0000 237 :
```

```
0000 239 .SBTTL LOCAL SYMBOLS AND UCB EXTENSIONS
0000 240
0000 241 :
0000 242 : LOCAL SYMBOLS
0000 243 :
00000007 0000 244 RB_NUM_REGS =7 :NUMBER OF DEVICE REGISTERS
0000 245 : (DOES NOT INCLUDE COMMAND REG (REG 8))
00000005 0000 246 RB_MP_C_SLM =5 :STATE=SEEK LINEAR MODE (READY TO GO)
0000 247 :
0000 248 :
0000 249 : UCB OFFSETS WHICH FOLLOW THE STANDARD UCB FIELDS
0000 250 :
0000 251 $DEFINI UCB :START OF UCB DEFINITIONS
000000C9 0000 252 .=UCB$W_OFFSET+1 :REDEFINE FOR LOCAL USE
00C9 253 :
00C9 254 $DEF UCB$B_DQ_FLAGS :LOCAL DRIVER FLAGS
00C9 255 $VIELD UCB,0,<- :START OF DQ FLAGS DEFINITIONS
00C9 256 <DQ_SIP,,M>,- :SEEK IN PROGRESS
00C9 257 <DQ_DIP,,M>,- :DATA CHECK IN PROGRESS
00C9 258 <DQ_ECC_DEFER,,M>,- :ECC CORRECTION DEFERRED TILL AFTER
00C9 259 > :RETRY ATTEMPT
00C9 260 :END OF DQ FLAGS BIT DEFINITIONS
000000CC 00C9 261
00C9 262 .=UCB$K_LCL_DISK_LENGTH
00CC 263 :
00CC 264 :ADJACENCY OF UCB EXTENSIONS ASSUMED BY DQ_REGDUMP AND READ HEADER CODE
00CC 265 :
00CC 266 :
00CC 267 $DEF UCB$L_DQ_CS .BLKL 1 :CONTROL STATUS REGISTER
00D0 268 $DEF UCB$L_DQ_BA .BLKL 1 :BUS ADDRESS REGISTER
00D4 269 $DEF UCB$L_DQ_BC .BLKL 1 :BYTE COUNT REGISTER
00D8 270 $DEF UCB$L_DQ_DA .BLKL 1 :DISK ADDRESS REGISTER
00DC 271 $DEF UCB$L_DQ_MP .BLKL 1 :MULTIPURPOSE REGISTER
00E0 272 $DEF UCB$L_DQ_FMPR .BLKL 1 :FINAL MAP REGISTER
00E4 273 $DEF UCB$L_DQ_PMPR .BLKL 1 :PREVIOUS MAP REGISTER
00E8 274 $DEF UCB$L_DQ_DPR .BLKL 1 :DATAPATH REGISTER (NEVER LOADED)
00EC 275 $DEF UCB$W_DQ_HDR1 .BLKW 1 :SAVED HEADER WORD 1
00EE 276 $DEF UCB$W_DQ_HDR2 .BLKW 1 :SAVED HEADER WORD 2
00F0 277 $DEF UCB$W_DQ_HDR3 .BLKW 1 :SAVED HEADER WORD 3
00F2 278 $DEF UCB$L_DQ_CURDA .BLKL 1 :CURRENT DISK ADDRESS
00F6 279 $DEF UCB$L_DQ_PREVDA .BLKL 1 :PREVIOUS DISK ADDRESS
00FA 280
000000FA 00FA 281 UCB$K_DQ_LEN = :LENGTH OF EXTENDED UCB
00FA 282 $DEFEND UCB :END OF UCB DEFINITIONS
0000 283 :
0000 284 :
0000 285 : RB730:RB02/RB80 REGISTER OFFSETS FROM CSR ADDRESS
0000 286 :
0000 287 :
0000 288 $DEFINI RB :START OF REGISTER DEFINITIONS
0000 289 :
0000 290 $DEF RB_CS .BLKL 1 :CONTROL STATUS REGISTER (CSR)
0004 291 $VIELD RB_CS,0,<- :START OF CSR BIT DEFINITIONS
0004 292 <DRDY,,M>,- :DRIVE READY
0004 293 <FCODE,3,M>,- :FUNCTION CODE
0004 294 <2>,- :RESERVED BITS
0004 295 <IE,,M>,- :INTERRUPT ENABLE
```

```
0004 296 <CRDY,,M>,- : CONTROLLER READY
0004 297 <DS,2,M>,- : DRIVE SELECT
0004 298 <OP1,,M>,- : OPERATION INCOMPLETE
0004 299 <DCK,,M>,- : DATA CRC OR HEADER CRC OR DATA ECC
0004 300 <DLT,,M>,- : DATA LATE OR HEADER NOT FOUND
0004 301 <NXM,,M>,- : NON-EXISTENT MEMORY
0004 302 <DE,,M>,- : DRIVE ERROR
0004 303 <CE,,M>,- : COMPOSITE ERROR
0004 304 <ATN,4,M>,- : DRIVE ATTENTION BITS
0004 305 <ECS,2>,- : ECC STATUS
0004 306 <SSE1,,M>,- : SKIP SECTOR ERROR INHIBIT
0004 307 <SSE,,M>,- : SKIP SECTOR ERROR
0004 308 <IR,,M>,- : RB730 INTERRUPT REQUEST
0004 309 <MTN,,M>,- : MAINTENANCE MODE
0004 310 <TYP,,M>,- : DRIVE TYPE 1=RB80, 0=RB02
0004 311 <ASS1,,M>,- : AUTOMATIC SKIP SECTOR INHIBIT
0004 312 <TO1,,M>,- : TIME OUT INHIBIT (U-DIAG'S)
0004 313 <FMT,,M>,- : R80 FORMAT CONTROL
0004 314 <,2>- : RESERVED BITS
0004 315 > : END CSR BIT DEFINITIONS
0004 316
0004 317 $DEF RB_BA .BLKL 1 :BUS ADDRESS REGISTER (BAR)
0008 318 $DEF RB_BC .BLKL 1 :BYTE COUNT REGISTER (BCR)
0008 319
000C 320 $DEF RB_DA .BLKL 1 :DISK ADDRESS REGISTER (DAR)
000C 321 _VIELD RB_DA,0,<- :START OF DAR BIT DEFINITIONS
0010 322 <SEC,8>,- : SECTOR
0010 323 <TRK,8>,- : TRACK
0010 324 <CYL,16>- : CYLINDER
0010 325 > : END OF DAR BIT DEFINITIONS
0010 326
0010 327 $DEF RB_MP .BLKL 1 :MULTIPURPOSE REGISTER (MPR)
0010 328 _VIELD RB_MP,0,<- :RB02 STATUS WORD DEFINITIONS
0014 329 <STA,3>,- : DRIVE STATE
0014 330 <BH,,M>,- : BRUSH HOME
0014 331 <HO,,M>,- : HEADS OUT
0014 332 <CO,,M>,- : COVER OPEN
0014 333 <HS,,M>,- : HEAD SELECT
0014 334 <,1>- : RESERVED
0014 335 <DSE,,M>,- : DRIVE SELECT ERROR
0014 336 <VC,,M>,- : VOLUME CHECK
0014 337 <WGE,,M>,- : WRITE GATE ERROR
0014 338 <SPD,,M>,- : SPIN ERROR
0014 339 <SKTO,,M>,- : SEEK TIME OUT
0014 340 <WL,,M>,- : WRITE LOCK
0014 341 <HCE,,M>,- : CURRENT HEAD ERROR
0014 342 <WDE,,M>- : WRITE DATA ERROR
0014 343 >
0014 344 >_VIELD RB_MP,0,<- :GET STATUS COMMAND DEFINITIONS
0014 345 <MRK,,M>,- : MARK (ALWAYS 1)
0014 346 <STS,,M>,- : GET STATUS
0014 347 <,1>- : RESERVED
0014 348 <RST,,M>- : RESET
0014 349 >
0014 350 >_VIELD RB_MP,0,<- :RB80 STATUS WORD DEFINITIONS
0014 351 <SEC,5>- : CURRENT RB80 SECTOR
0014 352
```



```
0014 353      <3>.-      : RESERVED
0014 354      <FLT,M>.-  : DRIVE FAULT
0014 355      <PLGV,M>.- : PLUG VALID
0014 356      <SKE,M>.-  : SEEK ERROR
0014 357      <ONCY,M>.- : ON CYLINDER
0014 358      <DRDY,M>.- : DRIVE READY
0014 359      <WTP,M>.-  : WRITE PROTECT
0014 360      <,2>.-    : RESERVED
0014 361      >        : END MPR BIT DEFINITIONS
0014 362
0014 363 $DEF RB_EC1 .BLKL 1 : ECC POSITION REGISTER (EPOR)
0018 364 -VIELD RB_EC1 0,<- : START OF EC1 BIT DEFINITIONS
0018 365      <POS,13>.-    : STARTING BIT POSITION OF ECC ERROR
0018 366      <,21>-      : RESERVED
0018 367      >        : END EC1 BIT DEFINITIONS
0018 368
0018 369 $DEF RB_EC2 .BLKL 1 : ECC PATTERN REGISTER (EPAR)
001C 370 -VIELD RB_EC2 0,<- : START OF EC2 BIT DEFINITIONS
001C 371      <PAT,11>.-    : PATTERN OF ECC ERROR BURST
001C 372      <,21>-      : RESERVED
001C 373      >        : END EC2 BIT DEFINITIONS
001C 374
001C 375 $DEF RB_CMD .BLKL 1 : AUXILLARY COMMAND REGISTER
0020 376 -VIELD RB_CMD 0,<- : START OF CMD BIT DEFINITIONS
0020 377      <INIT,32>.-   : SUBSYSTEM CLEAR <-- -1
0020 378      >        : END CMD BIT DEFINITIONS
0020 379
0020 380 $DEFEND RB      : END RB730:RB80/RB02 REGISTER DEFS
0000 381
0000 382 :
0000 383 : HARDWARE FUNCTION CODES
0000 384 :
00000000 0000 385 F NOP=0*2      : NO OPERATION
00000004 0000 386 F UNLOAD=2*2    : GET STATUS/RESET
00000006 0000 387 F SEEK=3*2      : SEEK CYLINDER
00000006 0000 388 F RECAL=3*2     : RECALIBRATE (SEEK -1)
00000004 0000 389 F DRVCLR=2*2   : DRIVE CLEAR (GET STATUS)
00000000 0000 390 F RELEASE=0*2    : NO OPERATION
00000000 0000 391 F OFFSET=0*2     : NO OPERATION
00000000 0000 392 F RETCENTER=0*2   : NO OPERATION
00000004 0000 393 F PACKACK=2*2     : PACK ACKNOWLEDGE (SET VOLUME VALID)
00000000 0000 394 F STARTSPNDL=0*2 : NO OPERATION
00000002 0000 395 F WRITECHECK=1*2  : WRITE CHECK
0000000A 0000 396 F WRITEDATA=5*2   : WRITE DATA
00000000 0000 397 F WRITEHEAD=0*2   : WRITE HEADER (WHEN FMT BIT SET)
0000000C 0000 398 F READDATA=6*2    : READ DATA
00000008 0000 399 F READHEAD=4*2    : READ HEADER
00000004 0000 400 F GETSTATUS=2*2   : GET STATUS (DRIVER INTERNAL USE)
00000000 0000 401 F WRITETRACKD=0*2 : NOP
00000000 0000 402 F READTRACKD=0*2  : NOP
00000004 0000 403 F AVAILABLE=2*2   : GET STATUS/RESET
0000 404
```

```
0000 406 .SBTTL STANDARD TABLES
0000 407
0000 408
0000 409 : DRIVER PROLOGUE TABLE
0000 410 :
0000 411 : THE DPT DESCRIBES DRIVER PARAMETERS AND I/O DATABASE FIELDS
0000 412 : THAT ARE TO BE INITIALIZED DURING DRIVER LOADING AND RELOADING
0000 413 :
0000 414
0000 415 DPTAB - ;DPT CREATION MACRO
0000 416 END=DQ END,- ;END OF DRIVER LABEL
0000 417 ADAPTER=UBA,- ;ADAPTER TYPE = UNIBUS
0000 418 FLAGS=DPT$M_SVP,- ;SYSTEM PAGE TABLE ENTRY REQ.
0000 419 MAXUNITS=4,- ;MAXIMUM FOUR DRIVES PER RB730
0000 420 DEFUNITS=4,- ;INTERROGATE FOUR DRIVES
0000 421 DELIVER=DQ DELIVER,- ;UNIT TEST ROUTINE
0000 422 UCBSIZE=UCB$K_DQ_LEN,- ;LENGTH OF UCB
0000 423 NAME=DDDRIVER ;DRIVER NAME
0038 424
0038 425 DPT_STORE INIT ;START CONTROL BLOCK INIT VALS.
0038 426 DPT_STORE DDB,DDB$K_ACPD,L,<^A\F11\> ;DEFAULT ACP NAME
003F 427 DPT_STORE DDB,DDB$K_ACPD+3,B,DDB$K_PACK ;ACP CLASS
0043 428 DPT_STORE UCB,UCB$B_FIPL,B,8 ;FORK IPL
0047 429 DPT_STORE UCB,UCB$K_DEVCHAR,L,- ;DEVICE CHARACTERISTICS
0047 430 <DEV$M_FOD- ;FILES ORIENTED
0047 431 :DEV$M_DIR- ;DIRECTORY STRUCTURED
0047 432 :DEV$M_AVL- ;AVAILABLE
0047 433 :DEV$M_ELG- ;ERROR LOGGING
0047 434 :DEV$M_SHR- ;SHAREABLE
0047 435 :DEV$M_IDV- ;INPUT DEVICE
0047 436 :DEV$M_ODV- ;OUTPUT DEVICE
0047 437 :DEV$M_RND- ;RANDOM ACCESS
004E 438 DPT_STORE UCB,UCB$K_DEVCHAR2,L,- ;DEVICE CHARACTERISTICS
004E 439 <DEV$M_NNM> ;PREFIX NAME WITH 'nodes'
0055 440 DPT_STORE UCB,UCB$B_DEVCLASS,B,DQ$ DISK ;DEVICE CLASS
0059 441 DPT_STORE UCB,UCB$W_DEVBUFSIZ,W,512 ;DEFAULT BUFFER SIZE
005E 442 DPT_STORE UCB,UCB$B_DIPL,B,21 ;DEVICE IPL
0062 443 DPT_STORE UCB,UCB$B_ERTMAX,B,8 ;MAX ERROR RETRY COUNT
0066 444 DPT_STORE UCB,UCB$K_DQ_CURDA,L,-1 ;CURRENT DISK ADDRESS
006D 445
006D 446 DPT_STORE REINIT ;START CONTROL BLOCK RE-INIT
006D 447 DPT_STORE CRB,CRB$K_INTD+4,D,DQ INT ;INTERRUPT SERV. ROUT. ADDRESS
0072 448 DPT_STORE CRB,CRB$K_INTD+VEC$K_INITIAL,- ;CONTROLLER INIT ADDRESS
0072 449 D,DQ RB730 INIT
0077 450 DPT_STORE CRB,CRB$K_INTD+VEC$K_UNITINIT,- ;UNIT INIT ADDRESS
0077 451 D,DQ UNIT INIT
007C 452 DPT_STORE DDB,DDB$K_DDT,D,DQ$DDT ;DDT ADDRESS
0081 453
0081 454 DPT_STORE END ;END OF INITIALIZATION TABLE
0000 455
0000 456 : DRIVER DISPATCH TABLE
0000 457 :
0000 458 :
0000 459 : THE DDT LISTS ENTRY POINTS FOR DRIVER SUBROUTINES WHICH ARE
0000 460 : CALLED BY THE OPERATING SYSTEM.
0000 461 :
0000 462 :
```

```
0000 463 DDTAB - ;DDT CREATION MACRO
0000 464 DEVNAM=DQ - ;NAME OF DEVICE
0000 465 START=DQ STARTIO,- ;START I/O ROUTINE
0000 466 FUNCTB=DQ FUNCTABLE,- ;FUNCTION DECISION TABLE
0000 467 CANCEL=0,- ;CANCEL=NO-OP FOR FILES DEVICE
0000 468 REGDMP=DQ REGDUMP,- ;REGISTER DUMP ROUTINE
0000 469 DIAGBF=<<<RB_NUM_REGS+6+5+3+1>*4>,- ;BYTES IN DIAG BUFFER
0000 470 ERLGBF=<<<<RB_NUM_REGS+6+1>*4>+EMBSL_DV_REGS+1> ;BYTES IN
0038 471 ;ERROR LOG BUFFER
0038 472
0038 473 : DIAGNOSTIC BUFFER SIZE = <<<7 RB730 REGISTER LONGWORDS + 6 UCB FIELD LONGWORDS
0038 474 + 5 IOC3DIAGBUFILL LONGWORDS + 3 BUFFER ALLOCATION
0038 475 LONGWORDS + 1 LONGWORD FOR # REGISTERS IN DQ_REGDUMP>
0038 476 * 4 BYTES/LONGWORD>
0038 477
0038 478 : ERROR LOG BUFFER SIZE = <<<<7 RB730 REGISTER LONGWORDS + 6 UCB FIELD LONGWORDS
0038 479 + 1 LONGWORD FOR # REGISTERS IN DQ_REGDUMP>
0038 480 * 4 BYTES/LONGWORD> + BYTES NEEDED FOR ERROR LOGGER
0038 481 TO SAVE SOFTWARE REGISTERS>
0038 482
0038 483 :
0038 484 :
0038 485 : HARDWARE FUNCTION CODE TABLE
0038 486 :
0038 487 : THIS TABLE MERGES THE FUNCTION CODE BITS WITH THE
0038 488 : INTERRUPT ENABLE BIT AND GENERATES THE CASE TABLE
0038 489 : INDEX SYMBOL. THIS IS AN ORDERED TABLE
0038 490
0038 491 FTAB: GENF F_NOP ;NO-OP
0038 492 GENF F_UNLOAD ;UNLOAD VOLUME (GET STATUS/RESET)
0040 493 GENF F_SEEK,CRDY ;SEEK
0044 494 GENF F_RECAL,CRDY ;RECALIBRATE
0048 495 GENF F_DRVCLR ;DRIVE CLEAR (GET STATUS/RESET)
004C 496 GENF F_RELEASE ;RELEASE PORT (NOP)
0050 497 GENF F_OFFSET ;OFFSET HEADS (NOP)
0054 498 GENF F_RETCENTER ;RETURN HEADS TO CENTERLINE (NOP)
0058 499 GENF F_PACKACK ;PACK ACKNOWLEDGE (GET STATUS/RESET)
005C 500 GENF F_STARTSPNDL ;START SPINDLE (NOP)
0060 501 GENF F_WRITECHECK,CRDY ;WRITE CHECK
0064 502 GENF F_WRITEDATA,CRDY ;WRITE DATA
0068 503 GENF F_READDATA,CRDY ;READ DATA
006C 504 GENF F_WRITEHEAD,<CRDY,FMT> ;WRITE HEADERS
0070 505 GENF F_READHEAD,CRDY ;READ HEADERS
0074 506 GENF F_WRIETRACKD ;WRITE TRACK DESCRIPTOR (NOP)
0078 507 GENF F_READTRACKD ;READ TRACK DESCRIPTOR (NOP)
007C 508 GENF F_AVAILABLE ;SET UNIT AVAILABLE (GET STATUS/RESET)
0080 509
```



```
0080 511 .SBTTL FUNCTION DECISION TABLES
0080 512
0080 513
0080 514 : FUNCTION DECISION TABLE
0080 515
0080 516 THE FDT LISTS VALID FUNCTION CODES, SPECIFIES WHICH
0080 517 CODES ARE BUFFERED, AND DESIGNATES SUBROUTINES TO
0080 518 PERFORM PREPROCESSING FOR PARTICULAR FUNCTIONS.
0080 519
0080 520
0080 521 DO_FUNCNAME:
0080 522 FUNCTAB
0080 523
0080 524 <NOP,-
0080 525 UNLOAD,-
0080 526 SEEK,-
0080 527 RECAL,-
0080 528 DRVCLR,-
0080 529 PACKACK,-
0080 530 SENSECHAR,-
0080 531 SETCHAR,-
0080 532 SENSEMODE,-
0080 533 SETMODE,-
0080 534 WRITECHECK,-
0080 535 READHEAD,-
0080 536 READLBLK,-
0080 537 WRITELBLK,-
0080 538 READPBLK,-
0080 539 WRITEPBLK,-
0080 540 READVBLK,-
0080 541 WRITEVBLK,-
0080 542 WRITEHEAD,-
0080 543 AVAILABLE,-
0080 544 ACCESS,-
0080 545 ACPCONTROL,-
0080 546 CREATE,-
0080 547 DEACCESS,-
0080 548 DELETE,-
0080 549 MODIFY,-
0080 550 MOUNT-
0080 551
0088 551 FUNCTAB
0088 552 <NOP,-
0088 553 UNLOAD,-
0088 554 SEEK,-
0088 555 RECAL,-
0088 556 DRVCLR,-
0088 557 PACKACK,-
0088 558 AVAILABLE,-
0088 559 SENSECHAR,-
0088 560 SETCHAR,-
0088 561 SENSEMODE,-
0088 562 SETMODE,-
0088 563 ACCESS,-
0088 564 ACPCONTROL,-
0088 565 CREATE,-
0088 566 DEACCESS,-
0088 567 DELETE,-

:LIST LEGAL FUNCTIONS
: NO-OP
: UNLOAD
: SEEK
: RECALIBRATE DRIVE
: DRIVE CLEAR
: PACK ACKNOWLEDGE
: SENSE CHARACTERISTICS
: SET CHARACTERISTICS
: SENSE MODE
: SET MODE
: WRITE CHECK
: READ HEADER
: READ LOGICAL BLOCK
: WRITE LOGICAL BLOCK
: READ PHYSICAL BLOCK
: WRITE PHYSICAL BLOCK
: READ VIRTUAL BLOCK
: WRITE VIRTUAL BLOCK
: WRITE DISK HEADERS
: AVAILABLE
: ACCESS FILE / FIND DIRECTORY ENTRY
: ACP CONTROL FUNCTION
: CREATE FILE AND/OR DIRECTORY ENTRY
: DEACCESS FILE
: DELETE FILE AND/OR DIRECTORY ENTRY
: MODIFY FILE ATTRIBUTES
: MOUNT VOLUME

:BUFFERED FUNCTIONS
: NO-OP
: UNLOAD
: SEEK
: RECALIBRATE
: DRIVE CLEAR
: PACK ACKNOWLEDGE
: AVAILABLE
: SENSE CHARACTERISTICS
: SET CHARACTERISTICS
: SENSE MODE
: SET MODE
: ACCESS FILE / FIND DIRECTORY ENTRY
: ACP CONTROL FUNCTION
: CREATE FILE AND/OR DIRECTORY ENTRY
: DEACCESS FILE
: DELETE FILE AND/OR DIRECTORY ENTRY
```

0088	568	MODIFY,-	: MODIFY FILE ATTRIBUTES
0088	569	MOUNT-	: MOUNT VOLUME
0088	570	>	
0090	571	FUNCTAB +ACPSREADBLK,-	: READ FUNCTIONS
0090	572	<READHEAD,-	: READ HEADER
0090	573	READLBLK,-	: READ LOGICAL BLOCK
0090	574	READPBLK,-	: READ PHYSICAL BLOCK
0090	575	READVBLK-	: READ VIRTUAL BLOCK
0090	576	>	
009C	577	FUNCTAB +ACPSWRITEBLK,-	: WRITE FUNCTIONS
009C	578	<WRITECHECK,-	: WRITE CHECK
009C	579	WRITEHEAD,-	: WRITE HEADER
009C	580	WRITELBLK,-	: WRITE LOGICAL BLOCK
009C	581	WRITEPBLK,-	: WRITE PHYSICAL BLOCK
009C	582	WRITEVBLK-	: WRITE VIRTUAL BLOCK
009C	583	>	
00A8	584	FUNCTAB +ACPSACCESS,-	: ACCESS FUNCTIONS
00A8	585	<ACCESS,-	: ACCESS FILE / FIND DIRECTORY ENTRY
00A8	586	CREATE-	: CREATE FILE AND/OR DIRECTORY ENTRY
00A8	587	>	
00B4	588	FUNCTAB +ACPSDEACCESS,-	: DEACCESS FUNCTION
00B4	589	<DEACCESS-	: DEACCESS FILE
00B4	590	>	
00C0	591	FUNCTAB +ACPSMODIFY,-	: MODIFY FUNCTIONS
00C0	592	<ACPCONTROL,-	: ACP CONTROL FUNCTION
00C0	593	DELETE,-	: DELETE FILE AND/OR DIRECTORY ENTRY
00C0	594	MODIFY-	: MODIFY FILE ATTRIBUTES
00C0	595	>	
00CC	596	FUNCTAB +ACPSMOUNT,-	: MOUNT FUNCTION
00CC	597	<MOUNT-	: MOUNT VOLUME
00CC	598	>	
00D8	599	FUNCTAB +EXESLCLDSKVALID,-	: LOCAL DISK VALID FUNCTIONS
00D8	600	<UNLOAD,-	: UNLOAD VOLUME
00D8	601	AVAILABLE,-	: UNIT AVAILABLE
00D8	602	PACKACK-	: PACK ACKNOWLEDGE
00D8	603	>	
00E4	604	FUNCTAB +EXESZEROPARM,-	: ZERO PARAMETER FUNCTIONS
00E4	605	<NOP,-	: NO-OP
00E4	606	UNLOAD,-	: UNLOAD
00E4	607	RECAL,-	: RECALIBRATE
00E4	608	DRVCLR,-	: DRIVE CLEAR
00E4	609	PACKACK,-	: PACK ACKNOWLEDGE
00E4	610	AVAILABLE-	: AVAILABLE
00E4	611	>	
00F0	612	FUNCTAB +EXESONEPARM,-	: ONE PARAMETER FUNCTION
00F0	613	<SEEK-	: SEEK
00F0	614	>	
00FC	615	FUNCTAB +EXESSENSEMODE,-	: SENSE FUNCTIONS
00FC	616	<SENSECHAR,-	: SENSE CHARACTERISTICS
00FC	617	SENSEMODE-	: SENSE MODE
00FC	618	>	
0108	619	FUNCTAB +EXESSETCHAR,-	: SET FUNCTIONS
0108	620	<SETCHAR,-	: SET CHARACTERISTICS
0108	621	SETMODE-	: SET MODE
0108	622	>	
0114	623		

```
0114 625 .SBTTL START I/O ROUTINE
0114 626
0114 627 :++
0114 628
0114 629 DQ_STARTIO - START I/O ROUTINE
0114 630
0114 631 FUNCTIONAL DESCRIPTION:
0114 632
0114 633 THIS FORK PROCESS IS ENTERED FROM THE EXECUTIVE AFTER AN I/O REQUEST
0114 634 PACKET HAS BEEN DEQUEUED, AND PERFORMS THE FOLLOWING:
0114 635
0114 636 - ACTIVATES THE DISK AFTER SETTING UCB FIELDS, OBTAINING
0114 637 UBA AND CONTROLLER RESOURCES, AND SETTING RB730 REGISTERS
0114 638
0114 639 - WAITS FOR AN INTERRUPT
0114 640
0114 641 - REGAINS CONTROL AFTER THE ISR SERVICES THE INTERRUPT, AND
0114 642 - RE-ACTIVATES THE DISK IF THE ORIGINAL FUNCTION
0114 643 IS NOT YET COMPLETE, OR
0114 644 - COMPLETES THE I/O REQUEST BY RELEASING RESOURCES,
0114 645 SETTING STATUS CODES, AND RETURNING TO THE EXEC.
0114 646
0114 647 INPUTS:
0114 648
0114 649 R3 - IRP ADDRESS (I/O REQUEST PACKET)
0114 650 R5 - UCB ADDRESS (UNIT CONTROL BLOCK)
0114 651 IRP$!_MEDIA - PARAMETER LONGWORD (LOGICAL BLOCK NUMBER)
0114 652
0114 653 OUTPUTS:
0114 654
0114 655 R0 - FIRST I/O STATUS LONGWORD: STATUS CODE & BYTES XFERED
0114 656 R1 - SECOND I/O STATUS LONGWORD: 0 FOR DISKS
0114 657
0114 658 THE I/O FUNCTION IS EXECUTED.
0114 659
0114 660 ALL REGISTERS EXCEPT R0-R4 ARE PRESERVED.
0114 661
0114 662 :--
0114 663
0114 664 DQ_STARTIO:
00F2 C5 DO 0114 665 MOVL UCB$!_DQ_CURDA(R5),- ;START I/O OPERATION
00F6 C5 0118 666 UCB$!_DQ_PREVDA(R5) ;SAVE CURRENT DISK ADDRESS
011B 667 ;... FOR ERROR LOGGING
011B 668
011B 669 :
011B 670 : PREPROCESS UCB FIELDS
011B 671 :
011B 672 PREPROCESS:
011B 673 MOVL IRP$!_MEDIA(R3),- ;ALTERNATE ENTRY NAME
00BC C5 011E 674 UCB$!_MEDIA(R5) ;STORE DISK ADDRESS
0121 675 BDRVTYP RB80,T0$ ;BRANCH IF RB80
0127 676 BBS #IRP$V_PHYSIO,- ;IF SET - PHYSICAL I/O
0129 677 IRP$W_STS(R5),10$
012C 678 MULL3 #2,UCB$!_MEDIA(R5),R0 ;RB02 HAS 1/2 SECTOR PER BLOCK
0132 679 MOVZBL UCB$B_SECTORS(R5),R2 ;GET NUMBER OF SECTORS PER TRACK
0136 680 CLRL R1 ;CLEAR HIGH PART OF DIVIDEND
00BC C5 50 50 52 7B 0138 681 EDIV R2,R0,R0,UCB$!_MEDIA(R5) ;CALCULATE SECTOR NUMBER AND STORE
```



```
51 52 45 A5 9A 013F 682      MOVZBL UCBSB_TRACKS(R5),R2      ;GET NUMBER OF TRACKS PER CYLINDER
51 50 50 52 7B 0143 683      EDIV      R2,R0,R0,R1      ;CALCULATE TRACK AND CYLINDER
00BD C5 51 90 0148 684      MOV      R1,UCBSL_MEDIA+1(R5) ;STORE TRACK NUMBER
00BE C5 50 80 014D 685      MOVW     R0,UCBSL_MEDIA+2(R5) ;STORE CYLINDER NUMBER
0081 C5 90 0152 686      ;
0080 C5 90 0152 687 10$: MOV      UCBSB_ERTMAX(R5),-      ;INITIALIZE ERROR RETRY COUNT
00C0 C5 7E A5 80 0156 688      UCBSB_ERTCNT(R5)      ;
009A C5 20 A3 80 0159 689      MOVW     UCBSW_BCNT(R5),UCBSW_BCR(R5) ;INITIALIZE REMAINING BYTE COUNT
51 20 A3 06 80 015F 690      MOVW     IRPSW_FUNC(R3),UCBSW_FUNC(R5) ;SAVE FUNCTION CODE AND MODIFIERS
0092 C5 51 91 0165 691      EXTZV     #IRPSW_FCODE,-      ;EXTRACT I/O FUNCTION CODE
51 0092 C5 51 91 0167 692      #IRPSW_FCODE,IRPSW_FUNC(R3),R1 ;
00BC C5 10 78 0168 693      MOV      R1,UCBSB_FEX(R5)      ;STORE FUNCTION DISPATCH INDEX
00BC C5 08 12 0170 694      CMPB      #10$,SEER,R1      ;SEEK FUNCTION?
00BC C5 02 78 0173 695      BNEQ      30$,      ;IF NEQ - NO
00BC C5 02 78 0175 696      ASHL      #16,UCBSL_MEDIA(R5),- ;SHIFT CYLINDER ADDRESS
00BC C5 02 78 017A 697      UCBSL_MEDIA(R5)      ;...INTO HIGH WORD
00BC C5 02 78 017D 698 30$: BICW      #UCBSM_DIAGBUF-      ;CLEAR DIAGNOSTIC BUFFER PRESENT
00BC C5 02 78 017E 699      !UCBSM-ECC,-      ;...AND ECC CORRECTION MADE FLAGS
00BC C5 02 78 017E 700      UCBSW_DEVSTS(R5)      ;...IN DEVICE STATUS WORD
00BC C5 02 78 0181 701      BBC      #IRPSW_DIAGBUF,-      ;IF CLR - NO DIAG BUFFER
00BC C5 02 78 0183 702      IRPSW_STS(R3),FDISPATCH ;
00BC C5 02 78 0186 703      BISW      #UCBSM_DIAGBUF,UCBSW_DEVSTS(R5) ;SET DIAG BUFFER PRESENT
00BC C5 02 78 018A 704      ;
00BC C5 02 78 018A 705      ;
00BC C5 02 78 018A 706      ;
00BC C5 02 78 018A 707      ;
00BC C5 02 78 018A 708      ;
00BC C5 02 78 018A 709      ;
00BC C5 02 78 018A 710      ;
00BC C5 02 78 018A 711      ;
00BC C5 02 78 018A 712      ;
00BC C5 02 78 018A 713      ;
00BC C5 02 78 018A 714      ;
00BC C5 02 78 018A 715      ;
00BC C5 02 78 018A 716      ;
00BC C5 02 78 018A 717      ;
00BC C5 02 78 018A 718      ;
00BC C5 02 78 018A 719      ;
00BC C5 02 78 018A 720      ;
00BC C5 02 78 018A 721      ;
00BC C5 02 78 018A 722      ;
00BC C5 02 78 018A 723      ;
00BC C5 02 78 018A 724      ;
00BC C5 02 78 018A 725      ;
00BC C5 02 78 018A 726      ;
00BC C5 02 78 018A 727      ;
00BC C5 02 78 018A 728      ;
00BC C5 02 78 018A 729      ;
00BC C5 02 78 018A 730      ;
00BC C5 02 78 018A 731      ;
00BC C5 02 78 018A 732      ;
00BC C5 02 78 018A 733      ;
00BC C5 02 78 018A 734      ;
00BC C5 02 78 018A 735      ;
00BC C5 02 78 018A 736      ;
00BC C5 02 78 018A 737      ;
00BC C5 02 78 018A 738      ;

CENTRAL FUNCTION DISPATCH

FDISPATCH:
53 5B A5 D0 018A 711      MOVL      UCBSL_IRP(R5),R3      ;FUNCTION DISPATCH
10 2A A3 E0 018E 712      BBS      #IRPSW_PHYSIO,-      ;GET IRP ADDRESS
0B 64 A5 E0 0190 713      BBS      IRPSW_STS(R3),10$      ;IF SET - PHYSICAL I/O FUNCTION
50 0254 8F 3C 0193 714      BBS      #UCBSW_VALID,-      ;IF SET - VOLUME SOFTWARE VALID
017E 31 B4 0195 715      MOVZWL     #SS$VOLINV,R0      ;SET VOLUME INVALID STATUS
00C9 C5 94 0198 716      CLRW      UCBSW_BCNT(R5)      ;SET ZERO BYTES TRANSFERRED
0092 C5 9A 019D 717      BRW      FUNCXT      ;AND RETURN TO CALLER
53 00C9 C5 94 01A0 718      ;
53 0092 C5 9A 01A3 719      ;
53 0092 C5 9A 01A7 720 10$: CLRB      UCBSB_DQ_FLAGS(R5)      ;CLEAR LOCAL FLAGS
53 0092 C5 9A 01A7 721      MOVZBL     UCBSB_FEX(R5),R3      ;GET FUNCTION DISPATCH INDEX
53 0092 C5 9A 01AC 722      CASE      R3,-      ;DISPATCH TO FUNCTION HANDLING ROUTINE
53 0092 C5 9A 01AC 723      NOP      -      ;NO OPERATION
53 0092 C5 9A 01AC 724      UNLOAD,-      ;UNLOAD
53 0092 C5 9A 01AC 725      SEEK,-      ;SEEK
53 0092 C5 9A 01AC 726      RECAL,-      ;RECALIBRATE
53 0092 C5 9A 01AC 727      DRVCLR,-      ;DRIVE CLEAR
53 0092 C5 9A 01AC 728      RELEASE,-      ;RELEASE
53 0092 C5 9A 01AC 729      OFFSET,-      ;OFFSET HEADS
53 0092 C5 9A 01AC 730      RETCENTER,-      ;RETURN TO CENTER
53 0092 C5 9A 01AC 731      PACKACK,-      ;PACKACK
53 0092 C5 9A 01AC 732      STARTSPNDL,-      ;START SPINDLE
53 0092 C5 9A 01AC 733      WRITECHECK,-      ;WRITE CHECK
53 0092 C5 9A 01AC 734      WRITEDATA,-      ;WRITE DATA
53 0092 C5 9A 01AC 735      READDATA,-      ;READ DATA
53 0092 C5 9A 01AC 736      WRITEHEAD,-      ;WRITE HEADER
53 0092 C5 9A 01AC 737      READHEAD,-      ;READ HEADER
53 0092 C5 9A 01AC 738      WRITETRACKD,-      ;WRITE TRACK DESCRIPTOR
```

```
01AC 739 READTRACKD,- ; READ TRACK DESCRIPTOR
01AC 740 AVAILABLE,- ; UNIT AVAILABLE
01AC 741 >
01D4 742
01D4 743
01D4 744 : IOS UNLOAD AND IOS AVAILABLE INDICATE THE UNIT IS NOT MOUNTED
01D4 745 : SO WE CLEAR SOFTWARE VOLUME VALID. IOS PACKACK INDICATES THAT
01D4 746 : SOFTWARE IS READY TO MOUNT OR ACCESS VOLUME SO WE SET SOFTWARE
01D4 747 : VALID. ON PACKACKS'S WE FOLLOW THIS WITH A GET STATUS AND RESET.
01D4 748 : IF THE OBTAINED STATUS INDICATES THAT THE DRIVE IS NOT READY
01D4 749 : THEN VOLUME VALID WILL BE CLEARED.
01D4 750 :
01D4 751
01D4 752 PACKACK: ;PACK ACKNOWLEDGE
01D4 753 BBSS #UCBSV_VALID,- ;SET SOFTWARE VOLUME VALID
0E 64 A5 E2 01D6 754 UCBSW_STS(R5),NOP ;...
01D9 755 EXFUNCL RETRYERR,F_DRVCLR ;GET STS AND RESET, RETRY ERRORS
43 11 01E0 756 BRB NORMAL ;SUCCESSFUL - EXIT WITH NORMAL STATUS
01E2 757
01E2 758 UNLOAD: ;UNLOAD
01E2 759 AVAILABLE: ;UNIT AVAILABLE
00 64 A5 E5 01E2 760 BBCC #UCBSV_VALID,- ;CLEAR SOFTWARE VALID
01E4 761 UCBSW_STS(R5),NOP ;...
01E7 762 NOP: ;NO-OP
01E7 763 RELEASE: ;RELEASE PORT (NOP)
01E7 764 OFFSET: ;OFFSET HEADS (NOP)
01E7 765 RETCENTER: ;RETURN TO CENTERLINE (NOP)
01E7 766 STARTSPNDL: ;START SPINDLE (NOP)
01E7 767 WRITETRACKD: ;WRITE TRACK DESCRIPTOR (NOP)
01E7 768 READTRACKD: ;READ TRACK DESCRIPTOR (NOP)
35 11 01E7 769 EXFUNCL RETRYERR,F_NOP ;EXECUTE A HARDWARE NOP, RETRY ERRORS
01EE 770 BRB NORMAL ;SUCCESSFUL - EXIT WITH NORMAL STATUS
01F0 771
01F0 772 SEEK: ;SEEK
01F0 773 RECAL: ;RECALIBRATE
01F0 774 DRVCLR: ;DRIVE CLEAR (GET STATUS & RESET)
01F0 775 WRITEHEAD: ;WRITE HEADERS (AND DATA)
01F0 776 EXFUNCL RETRYERR ;EXECUTE FUNCTION - RETRY IF FAILURE
2F 11 01F4 777 BRB NORMAL ;SUCCESSFUL - EXIT WITH NORMAL STATUS
01F6 778
01F6 779 WRITECHECK: ;WRITE CHECK
01F6 780 READHEAD: ;READ HEADER
4000 8F AA 01F6 781 BICW #IOSM_DATACHECK,- ;CLEAR DATA CHECK REQUEST-
009A C5 01FA 782 UCBSW_FUNC(R5) ;TO PREVENT EXTRA WRITE CHECK
01FD 783
01FD 784 WRITEDATA: ;WRITE DATA
01FD 785 READDATA: ;READ DATA
00BE C5 B1 01FD 786 CMPW UCBSL_MEDIA+2(R5),- ;NEW CYLINDER?
00F4 C5 0201 787 UCBSL_DQ_CURDA+2(R5) ;...
OF 12 0204 788 BNEQ 20$ ;BRANCH IF SO
0206 789 BDRVTYP RB80,TRANSFER ;BRANCH IF RB80
00BD C5 91 020C 790 CMPB UCBSL_MEDIA+1(R5),- ;OR NEW TRACK? (MUST DO SEEK TO
00F3 C5 0210 791 UCBSL_DQ_CURDA+1(R5) ;...SELECT HEAD ON RB02)
OC 13 0213 792 BEQL TRANSFER ;BRANCH IF NO SEEK REQUIRED
53 0092 C5 9A 0215 793 20$: EXFUNCL RETRYERR,F_SEEK ;EXECUTE EXPLICIT SEEK - RETRY IF ERROR
021C 794 MOVZBL UCBSB_FEX(R5),R3 ;RESTORE FUNCTION DISPATCH INDEX
0221 795
```

```

0221 796 :
0221 797 : DRIVE HAS BEEN POSITIONED -- NOW EXECUTE THE TRANSFER
0221 798 :
0221 799 :
0221 800 TRANSFER:
0221 801 EXFUNCL CHECKECC ;EXECUTE TRANSFER FUNCTION
0223 802
0223 803
0223 804 :
0223 805 : OPERATON COMPLETION
0223 806 :
0223 807 :
0223 808 NORMAL: ;SUCCESSFUL OPERATION COMPLETE
50 0639 8F 3C 0223 809 MOVZWL #SS$ WASECC,R0 ;ASSUME CORRECTED ECC ERROR
03 68 A5 E0 022A 810 BBS #UCBSV ECC, - ;BRANCH IF CORRECTED ECC
50 01 3C 022C 811 UCBSW DEVSTS(R5),10$ ;... ERROR OCCURED
00EC 31 022F 812 MOVZWL #SS$ NORMAL,R0 ;SET NORMAL COMPLETION STATUS
0235 813 10$: BRW FUNCXT ;FUNCTION EXIT
0235 814

```



```
0235 816 .SBTTL RETRIABLE ERROR ANALYSIS
0235 817
0235 818
0235 819 A RETRIABLE ERROR HAS OCCURED ON A TRANSFER
0235 820 CHECK TO SEE IF ECC CORRECTION CAN BE APPLIED
0235 821
0235 822 R1 - CSR AT TIME OF ERROR
0235 823 R2 - MPR OF GET STATUS FOLLOWING ERROR
0235 824
0235 825 CHECKECC:
06 51 01 ED 0235 825 CMPZV #RB_CS_V_FCODE,- :WAS THIS A READ DATA OPERATION?
03 03 0235 826 #RB_CS_S_FCODE,R1,- :...
06E 12 023A 827 #<F_READDATA @ -1> :...
023C 828 BNEQ RETRYERR :BRANCH IF NOT
0242 829 BDRVTYP RB02,RETRYERR :BRANCH IF RB02
0243 830 BITW #RB_CS_M_DE- :DRIVE ERROR
0243 831 !RB_CS_M_NXM- :...OR NON EXISTENT MEMORY
0243 832 !RB_CS_M_DLT- :...OR DATA LATE
0243 833 !RB_CS_M_OPI,- :...OR OPERATION INCOMPLETE (HDR CRC)
51 7400 8F 0243 834 R1 :...?
61 12 0247 835 BNEQ RETRYERR :BRANCH IF SO
SD 51 0B E1 0249 836 BBC #RB_CS_V_DCK,R1,RETRYERR :BRANCH IF NOT A DATACHECK
14 ED 024D 837 CMPZV #RB_CS_V_ECS,- :COMPARE ECC STATUS BITS (START)
02 024F 838 #RB_CS_S_ECS,- :... (SIZE)
03 51 0250 839 R1,- :... (FROM)
56 12 0252 840 #B11 :...TO BINARY 11 (BOTH SET)
0252 841 BNEQ RETRYERR :BRANCH IF NOT CORRECTABLE
0254 842
0254 843
0254 844
0254 845
0254 846
0254 847
0254 848
0254 849
0254 850
0254 851
0254 852
0258 853
025B 854
025F 855
025F 856
50 0004 C5 C0 0264 857 ADDL UCBSL_DQ_BC(R5),R0
00000200 8F C2 0264 856 SUBL #*X200,R0
3D 19 026B 857 BLSS RETRYERR :BACKUP TO LAST GOOD BLOCK
50 01FF 8F B3 026D 858 BITW #*X1FF,R0 :WHOLE BLOCKS TRANSFERED?
36 12 0272 859 BNEQ RETRYERR :NO, SOMETHING WRONG, TRY AGAIN
7E 52 7D 0274 860 MOVQ R2,-(SP) :SAVE WORK REGISTERS
52 00C6 C5 0B 00 EA 0277 861 FFS #0,#11,UCBSW_EC2(R5),R2 :FIND THE FIRST ERROR BIT SET IN THE
53 0A 52 C3 027E 862 :ECC PATERN REGISTER
027E 863
0282 864
0282 865
0284 866
52 00C6 C5 53 52 D6 0284 866 BLEQ 10$ :BRANCH IF NO OTHER BITS SET
52 EF 0286 867 INCL R2 :POINT TO NEXT BIT IN PATERN
0C BA 028D 868 EXTZV R2,R3,UCBSW_EC2(R5),R2 :IS THERE MORE THAN ONE ERROR BIT SET?
028F 869 POPR #*M<R3,R2> :RESTORE WORK REGISTERS WITHOUT
10 1B 028F 870 BLEQU APPLY_ECC :...AFFECTING FLAGS
04 88 0291 871 BISB #UCBSM_DQ_ECC_DEFER,- :IF ONLY ONE ERROR BIT SET, THEN APPLY
0291 872 :ECC CORRECTION
: SIGNAL ECC CORRECTION DEFERRED
```

```
00C9 C5      0293 873      UCBSB_DQ_FLAGS(R5)      ;
7E A5 0200 8F A2 0296 874      SUBW #^X200,UCBSW_BCNT(R5) ;SHORTEN XFER BY ONE PAGE TO EXCLUDE ECC
                                0296 875      ;...BLOCK FROM NUMBER OF BYTES
                                029C 876      ;...TRANSFERRED
                                029C 877      ;BRANCH IF NO GOOD DATA WAS TRANSFERRED
                                029C 878      ;AND ATTEMPT TO RETRY
                                029E 879      ;OTHERWISE, BRANCH AND PERFORM A
034D 31 029E 880      BRW WRITECHK ;...WRITECHECK
                                02A1 881
                                02A1 882
                                02A1 883 APPLY_ECC:
00000000'GF 16 02A1 884      JSB G^IOCSAPPLYECC ;APPLY ECC CORRECTION
035B 31 02A7 885      BRW UPDATE ;CONTINUE TRANSFER BUT SUPPRESS
                                02AA 886      ;...WRITECHECK
                                02AA 887
                                02AA 888
                                02AA 889      A RETRIABLE ERROR HAS OCCURED
                                02AA 890
                                02AA 891      R1 - CSR AT TIME OF ERROR
                                02AA 892      R2 - MPR OF GET STATUS FOLLOWING ERROR
                                02AA 893
                                02AA 894
                                02AA 895 RETRYERR:
0080 C5 97 02AA 896      DECB UCBSB_ERTCNT(R5) ;ANY RETRIES LEFT?
08 14 02AE 897      BGTR RESETDRIVE ;IF GTR - YES
02 E4 02B0 898      BBSC #UCBSV_DQ_ECC_DEFER,- ;CORRECT THE ERROR WITH ECC IF WE CAN
00C9 C5 02B2 899      UCBSB_DQ_FLAGS(R5),-
EB 0A 11 02B5 900      APPLY_ECC
                                02B6 901      BRB FATALERR ;OTHERWISE, FATAL ERROR
                                02B8 902
                                02B8 903
                                02B8 904      ; ATTEMPT TO RESET STUBBORN DRIVE ERRORS BEFORE EXECUTING THE FUNCTION AGAIN
                                02B8 905
                                02B8 906
                                02B8 907 RESETDRIVE:
FECB 31 02B8 908      EXFUNCL RETRYERR,F_RECAL ;RECALIBRATE THE DRIVE
                                02BF 909      BRW FDISPATCH ;RETRY FUNCTION
                                02C2 910
```

```
02C2 912 .SBTTL FATAL ERROR ANALYSIS
02C2 913
02C2 914 :
02C2 915 A FATAL ERROR HAS OCCURED
02C2 916
02C2 917 R1 - CSR AT TIME OF ERROR OR
02C2 918 R2 - MPR OF GET STATUS FOLLOWING ERROR
02C2 919
02C2 920 FATALERR: UNRECOVERABLE ERROR
02C2 921 ASSUME RB_MP_V_WL EQ RB_MP_V_WTP :ASSUME RB02 AND RB80 USE
02C2 922 :SAME BIT FOR WRITE LOCK
02C2 923
02C2 924 BBC #RB_MP_V_WL,R2,30$ :BRANCH IF DRIVE IS NOT WRITELOCKED
50 13 52 0D E1 02C6 925 MOVZWL #SS$_WRTLCK,R0 :ASSUME WRITELOCK ERROR STATUS
025C 8F 3C 02CB 926 CMPB #CDF_WRTEDATA,- :WAS THIS A WRITE DATA OPERATION?
0093 C5 91 02CD 927 UCB$B_CEX(R5)
4F 13 02D0 928 BEQL FUNCXT :BRANCH IF SO
0D 91 02D2 929 CMPB #CDF_WRITEHEAD,- :WAS THIS A WRITE HEADER OPERATION?
0093 C5 02D4 930 UCB$B_CEX(R5)
48 13 02D7 931 BEQL FUNCXT :BRANCH IF SO
50 0254 8F 3C 02D9 932 30$: MOVZWL #SS$_VOLINV,R0 :ASSUME VOLUME INVALID
02DE 933 BDRVTYP RB02,50$ :BRANCH IF RB02
02E4 934
02E4 935 :
02E4 936 :
02E4 937 :
02E4 938 :
11 11 02E4 939 BRB 70$ :CONTINUE IN COMMON
02E6 940
02E6 941 :
02E6 942 :
02E6 943 :
02E6 944 :
02E6 945 :
02E6 946 :
02E6 947 :
02EA 948 :
04 52 0D E1 02EF 948 BBC #RB_MP_V_WL,R2,70$ :IF CLR - VOLUME NOT WRITE LOCKED
2A 52 0A E0 02F3 949 BBS #RB_MP_V_WGE,R2,FUNCXT :IF SET - WRITE GATE ERROR
02F7 950
50 005C 8F 3C 02F7 951 70$: MOVZWL #SS$_DATACHECK,R0 :ASSUME DATA CHECK ERROR STATUS
01 E1 02FC 952 BBC #UCB$V_DQ_DIP,- :BRANCH IF NO DATA CHECK IN PROGRESS
08 00C9 C5 02FE 953 UCB$B_DQ_FLAGS(R5),80$
04 51 0A E1 0302 954 BBC #RB_CS_V_OPI,R1,80$ :DATA CHECK INDICATED BY OPI AND
17 51 0B E0 0306 955 BBS #RB_CS_V_DCK,R1,FUNCXT :... DATA CHECK SET
030A 956
50 01F4 8F 3C 030A 957 80$: MOVZWL #SS$_PARITY,R0 :ASSUME PARITY ERROR STATUS
0E 51 0B E0 030F 958 BBS #RB_CS_V_DCK,R1,FUNCXT :IF SET - CRC ERROR
0313 959
50 008C 8F 3C 0313 960 90$: MOVZWL #SS$_DRVERR,R0 :ASSUME DRIVE ERROR STATUS
05 51 0E E0 0318 961 BBS #RB_CS_V_DE,R1,FUNCXT :IF SET - DRIVE ERROR
031C 962
50 0054 8F 3C 031C 963 MOVZWL #SS$_CTRLERR,R0 :ASSUME CONTROLLER ERROR STATUS
0321 964
```


035A 997
035A 998
035A 999
035A 1000
035A 1001
035A 1002
035A 1003
035A 1004
035A 1005
035A 1006
035A 1007
035A 1008
035A 1009
035A 1010
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035A 1024
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035A 1034
035A 1035
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035A 1042
035A 1043
035A 1044

.SBTTL HARDWARE FUNCTION DISPATCH

FEXL - RB730 HARDWARE FUNCTION EXECUTION

THIS ROUTINE IS CALLED VIA A BSB WITH A BYTE IMMEDIATELY FOLLOWING THAT SPECIFIES THE ADDRESS OF AN ERROR ROUTINE. ALL DATA IS ASSUMED TO HAVE BEEN SET UP IN THE UCB BEFORE THE CALL. THE APPROPRIATE PARAMETERS ARE LOADED INTO DEVICE REGISTERS AND THE FUNCTION IS INITIATED. THE RETURN ADDRESS IS STORED IN THE UCB AND A WAITFOR INTERRUPT IS EXECUTED. WHEN THE INTERRUPT OCCURS, CONTROL IS RETURNED TO THE CALLER.

INPUTS:

R3 = FUNCTION TABLE DISPATCH INDEX
R5 = DEVICE UNIT UCB ADDRESS

00(SP) = RETURN ADDRESS OF CALLER
04(SP) = RETURN ADDRESS OF CALLER'S CALLER

IMMEDIATELY FOLLOWING INLINE AT THE CALL SITE IS A BYTE WHICH CONTAINS A BRANCH DESTINATION TO AN ERROR RETRY ROUTINE.

OUTPUTS:

THERE ARE FOUR EXITS FROM THIS ROUTINE:

1. SPECIAL CONDITION - THIS EXIT IS TAKEN IF A POWER FAILURE OCCURS OR THE OPERATION TIMES OUT. IT IS A JUMP TO THE APPROPRIATE ERROR ROUTINE. NO DEVICE REGISTERS ARE SAVED.
2. FATAL ERROR - THIS EXIT IS TAKEN IF A FATAL CONTROLLER OR DRIVE ERROR OCCURS OR IF ANY ERROR OCCURS AND ERROR RETRY IS EITHER INHIBITED OR EXHAUSTED. IT IS A JUMP TO THE FATAL ERROR EXIT ROUTINE. ALL DEVICE REGISTERS ARE SAVED.
3. RETRIABLE ERROR - THIS EXIT IS TAKEN IF A RETRIABLE CONTROLLER OR DRIVE ERROR OCCURS AND ERROR RETRY IS NEITHER INHIBITED NOR EXHAUSTED. IT CONSISTS OF TAKING THE ERROR BRANCH EXIT SPECIFIED AT THE CALL SITE. ALL DEVICE REGISTERS ARE SAVED.
4. SUCCESSFUL OPERATION - THIS EXIT IS TAKEN IF NO ERRORS OCCUR DURING THE OPERATION. IT CONSISTS OF A RETURN INLINE. ONLY THE CSR IS SAVED.

IN ALL CASES IF AN ERROR OCCURS, AN ATTEMPT IS MADE TO LOG THE ERROR.

```
0093 009C C5 BED0 035A 1046 FEXL:
50 24 A5 D0 035A 1047 POPL UCBSL_DPC(R5)
51 2C A0 D0 035F 1048 MOV B R3,UCBSB_CEX(R5)
04 A1 55 D1 0364 1049 MOVL UCBSL_CRB(R5),R0
54 61 D0 0368 1050 MOVL CRBSL_INTD+VECSL_IDB(R0),R1
06 06 11 036C 1051 CMPL R5,IDBSL_OWNER(RT)
0370 1052 BNEQ 10$
0372 1053 MOVL IDBSL_CSR(R1),R4
0375 1054 BRB 20$
0377 1055 10$: REQPCAN
037D 1056 20$: CASE R3,<-
037D 1057 IMMED,-
037D 1058 IMMED,-
037D 1059 IMMED,-
037D 1060 POSIT,-
037D 1061 RECALB,-
037D 1062 DRCLR,-
037D 1063 IMMED,-
037D 1064 IMMED,-
037D 1065 IMMED,-
037D 1066 DRCLR,-
037D 1067 IMMED,-
037D 1068 >
0142 31 0395 1069 BRW XFER
```

:FUNCTION EXECUTOR
:SAVE DRIVER PC VALUE
:SAVE CASE INDEX
:GET ADDRESS OF PRIMARY CRB
:GET ADDRESS OF IDB
:DOES THIS PROCESS OWN CHANNEL?
:IF NEQ - NO
:SET ASSIGNED CHANNEL CSR ADDRESS
:REQUEST CHANNEL (RETURNS R4 = CSR ADR)
:DISPATCH TO PROPER FUNCTION ROUTINE
:NO OPERATION
:UNLOAD VOLUME (NOP)
:SEEK CYLINDER
:RECALIBRATE
:DRIVE CLEAR (GET STATUS & RESET)
:RELEASE DRIVE (NOP)
:OFFSET HEADS (NOP)
:RETURN TO CENTERLINE (NOP)
:PACK ACKNOWLEDGE
:START SPINDLE (NOP)
:TRANSFER FUNCTION


```
0398 1071 .SBTTL IMMEDIATE FUNCTION EXECUTION
0398 1072 IMMEDIATE FUNCTION EXECUTION
0398 1073
0398 1074 FUNCTIONS INCLUDE:
0398 1075
0398 1076 NO OPERATION,
0398 1077 DRIVE CLEAR, AND
0398 1078 PACK ACKNOWLEDGE
0398 1079
0398 1080 INPUTS:
0398 1081 R3 - CASE INDEX
0398 1082 R4 - CSR ADDRESS
0398 1083 R5 - UCB ADDRESS
0398 1084
0398 1085 FUNCTIONAL DESCRIPTION:
0398 1086
0398 1087 INTERRUPTS ARE LOCKED OUT, THE APPROPRIATE FUNCTION IS INITIATED WITH
0398 1088 INTERRUPT ENABLE, AND A WAITFOR INTERRUPT AND KEEP CHANNEL IS EXECUTED.
0398 1089
0398 1090 THE RESET COMMAND DOES NOT AFFECT AN R80 SO A RECALIBRATE, WHICH CLEARS
0398 1091 ERRORS, IS PERFORMED INSTEAD
0398 1092
0398 1093
0398 1094
0398 1095 DRCLR: ;GET STATUS AND RESET
0398 1096 BDRVTYP RB02,10$ ;BRANCH IF RB02
0398 1097 MOVZBL #CDF_RECAL,R3 ;SET FUNCTION AS RECALIBRATE
0093 53 03 9A 03A1 1098 MOV B R3,UCB$B_CEX(R5) ;SAVE CASE INDEX
0398 1099 BRB RECALB ;AND BRANCH TO EXECUTION
0398 1100
0398 1101 10$: MOVL #RB_MP_M_STS- ;GET STATUS AND
0398 1102 !RB_MP_M_RST- ;...RESET DRIVE
0398 1103 !RB_MP_M_MRK,- ;...INDICATE GET STATUS COMMAND PRESENT
50 0B 03 11 03A9 1104 R0 ;...IN R0
0398 1105 BRB EX_IMED ;EXECUTE THE FUNCTION
0398 1106
0398 1107 IMMED: ;GET STATUS
0398 1108 MOVL #RB_MP_M_STS- ;GET STATUS AND
0398 1109 !RB_MP_M_MRK,- ;...INDICATE GET STATUS COMMAND PRESENT
50 03 03AE 1110 R0 ;...IN R0
0398 1111
0398 1112 EX_IMED: ;EXECUTE IMMEDIATE FUNCTION
52 52 FC83 CF43 DO 03B0 1113 MOVL FTAB[R3],R2 ;FETCH FUNCTION CODE AND MODIFIERS
02 02 0B 54 A5 FO 03B6 1114 INSV UCB$W_UNIT(R5),#8,#2,R2 ;MERGE UNIT NUMBER
0398 1115 SAVIPL ;SAVE CURRENT IPL ON STACK
0398 1116 CKPWR 10$ ;RAISE IPL AND CHECK FOR POWERFAIL
10 A4 50 DO 03CC 1117 MOVL R0,RB_MP(R4) ;PREPARE FOR GETSTATUS OR RESET
64 52 DO 03D0 1118 MOVL R2,RB_CS(R4) ;INITIATE FUNCTION
0398 1119 WFIKPC RETREG,#10 ;WAITFOR INTERRUPT
0398 1120 IOFORK ;CREATE FORK PROCESS
02CA 31 03E3 1121 10$: BRW RETREG
0398 1122
```

```
03E6 1124 .SBTTL RECALIBRATE FUNCTION EXECUTION
03E6 1125
03E6 1126 RECALIBRATE FUNCTION EXECUTION
03E6 1127
03E6 1128 FUNCTIONS INCLUDE:
03E6 1129
03E6 1130 RECALIBRATE
03E6 1131
03E6 1132 INPUTS:
03E6 1133 R3 - CASE INDEX
03E6 1134 R4 - DEVICE CSR ADDRESS
03E6 1135 R5 - UCB ADDRESS
03E6 1136
03E6 1137 FUNCTIONAL DESCRIPTION:
03E6 1138
03E6 1139 FOR AN RB80, A RECALIBRATE IS PERFORMED. THE HEADS SEEK TO A KNOWN
03E6 1140 POSITION TO RESET THE DRIVES PHYSICAL POSITIONING LOGIC. THIS IS
03E6 1141 SIGNED BY REQUESTING A SEEK TO -1
03E6 1142
03E6 1143 FOR AN RB02, A READ HEADER IS PERFORMED. THE RB02 DOES NOT SUPPORT
03E6 1144 A RECALIBRATE FUNCTION. HOWEVER, THE SUPPORT MICROCODE FOR THE RB02
03E6 1145 KEEPS AN INTERNAL RECORD OF THE CURRENT DISK POSITION. WHENEVER A
03E6 1146 READ HEADER IS PERFORMED, IT UPDATES THAT POSITION WITH THE VALUE
03E6 1147 FOUND IN THE HEADER.
03E6 1148
03E6 1149
03E6 1150 RECALB:
03E6 1151 MNEGL #1,UCB$L_DQ_CURDA(R5) ;RECALIBRATE FUNCTION
03E6 1152 BDRVTYP RB02,50$ ;DISABLE SEEK OPTIMIZATION
03F1 1153 GETUNIT ;BRANCH IF RB02
03F9 1154 DSBINT UCB$B_DIPL(R5) ;GET UNIT NUMBER IN R2
64 52 FC33 CF43 C9 0400 1155 BISL3 FTAB[R3],R2,RB_CS(R4) ;SAVE IPL AND LOCK OUT DEVICE INTERRUPTS
64 64 01 D3 0407 1156 BITL #RB_CS_M_DRDY,RB_CS(R4) ;LOAD CSR (EXECUTION SUPPRESSED)
1C A4 01 CE 040A 1157 BNEQ 10$ ;IS DRIVE READY?
OC A4 01 CE 040C 1158 MNEGL #1,RB_CMD(R4) ;BRANCH IF SO
2E 11 0410 1159 10$: MNEGL #1,RB_DA(R4) ;INITIALIZE ENTIRE SUBSYSTEM
53 0E 9A 0414 1160 BRB SEEKI ;LOAD -1 IN DISK ADDRESS REGISTER
0093 C5 53 90 0416 1161 50$: MOVZBL #CDF_READHEAD,R3 ;INITIATE SEEK
00B9 31 0419 1162 MOVB R3,UCB$B_CEX(R5) ;SET FUNCTION AS READ HEADER
0421 1164 BRW XFER ;SAVE CASE INDEX
0421 1165 ;EXECUTE TRANSFER FUNCTION
```

```
0421 1167 .SBTTL POSITIONING FUNCTION EXECUTION
0421 1168 :
0421 1169 POSITIONING FUNCTION EXECUTION
0421 1170 :
0421 1171 FUNCTIONS INCLUDE:
0421 1172 :
0421 1173 SEEK CYLINDER
0421 1174 :
0421 1175 INPUTS:
0421 1176 R3 - CASE INDEX
0421 1177 R4 - DEVICE CSR ADDRESS
0421 1178 R5 - UCB ADDRESS
0421 1179 :
0421 1180 FUNCTIONAL DESCRIPTION:
0421 1181 :
0421 1182 THE CYLINDER ADDRESS IS LOADED INTO THE DISK ADDRESS REGISTER.
0421 1183 INTERRUPTS ARE LOCKED OUT, AND THE SEEK FUNCTION IS INITIATED.
0421 1184 WITH INTERRUPT ENABLE. THE UNIT MUST BE SELECTED BEFORE LOADING
0421 1185 THE CYLINDER ADDRESS (SO UCODE KNOWS WHETHER ITS AN RB80 OR RB02).
0421 1186 :
0421 1187 WHEN THE FIRST INTERRUPT IS RECEIVED THE CHANNEL IS RELEASED (MUST
0421 1188 OCCUR AT FORK LEVEL) AND THE COMPLETION INTERRUPT IS WAITED FOR.
0421 1189 THE SEEK MAY COMPLETE WHILE AT FORK LEVEL SO A FLAG IS USED TO
0421 1190 SYNCHRONIZE THE OPERATION.
0421 1191 :
0421 1192 :
0421 1193 :
0421 1194 POSIT: :POSITIONING FUNCTION
0421 1195 GETUNIT :GET UNIT NUMBER IN R2
0429 1196 DSBINT UCB$B_DIPL(R5) :SAVE IPL AND LOCK OUT DEVICE INTERUPTS
64 52 FC03 CF43 C9 0430 1197 BISL3 FTAB[R3],R2,RB_CS(R4) :LOAD CSR (EXECUTION SUPPRESSED)
OC A4 00BC C5 D0 0437 1198 MOVL UCB$L_MEDIA(R5),RB_DA(R4) :LOAD CYLINDER ADDRESS IN DAR
00BC C5 D0 043D 1199 MOVL UCB$L_MEDIA(R5),- :REMEMBER CURRENT DISK ADDRESS
00F2 C5 0441 1200 UCB$L_DQ_CURDA(R5) :...FOR SEEK OPTIMIZATION
0444 1201 :
0444 1202 SEEKI: :SEEK INITIATE
0444 1203 CKPWR 25$ :DISABLE INTERRUPTS, CHECK POWER
0451 1204 INITIATE :INITIATE THE FUNCTION
00C9 C5 01 88 0458 1205 BISB #UCB$M_DQ_SIP,- :SIGNAL SEEK IN PROGRESS
045A 1206 UCB$B_DQ_FLAGS(R5) :
045D 1207 BDRVTYP RB02,T0$ :BRANCH IF RB02
0463 1208 :
0463 1209 :RB80'S INITIATE SEEKS VERY QUICKLY (APPROX 30 USECS). CONSEQUENTLY
0463 1210 WE WAIT FOR THE SEEK TO INITIATE IN A LOOP, THEN CLEAR THE INITIATION
0463 1211 INTERRUPT AND WAIT FOR THE COMPLETION INTERRUPT.
0463 1212 :
0463 1213 :
0463 1214 TIMEWAIT #3,#RB_CS_M_CRDY,- :WAIT FOR CONTROLLER READY
0463 1215 RB_CS(R4),C :... 3*10 MICS
048A 1216 BLBC R0,10$ :BRANCH IF CONTROLLER STILL NOT READY
64 000F0000 8F E9 048D 1217 BICL #RB_CS_M_ATN,RB_CS(R4) :CLEAR INTERRUPT REQUEST FROM INITIATE
CA 0494 1218 ENBINT :DROP IPL AND CLEANUP STACK
16 11 0497 1219 BRB 20$ :
0499 1220 :
0499 1221 :RB02'S CAN TAKE UPTO A FULL SECTOR TIME TO INITIATE AN INTERRUPT.
0499 1222 :CONSEQUENTLY WE TAKE TWO INTERUPTS, ONE FOR SEEK INITIATE, THE OTHER
0499 1223 :FOR SEEK COMPLETION
```


28 00CC	OF	E0	0499	1224	108:	WFIKPC	RETREG,#10	:WAIT FOR INITIATION INTERRUPT
	CS		0499	1225		BBS	#RB_CS_V_CE,-	:BRANCH IF SEEK INITIATE FAILED
			04A3	1226			UCBSL_DQ_CS(R5),408	:...
			04A5	1227		IOFORK		:DROP TO FORK IPL
			04A9	1228		RELCHAN		:RELEASE THE CHANNEL
			04AF	1229	208:	DSBINT	UCBSB_DIPL(R5)	:RETURN TO DEVICE IPL
05 00C9	00	E4	04B5	1230		BBSC	#UCBSV_DQ_SIP,-	:BRANCH IF SEEK NOT COMPLETED YET
	CS		04BC	1231			UCBSB_DQ_FLAGS(R5),308	:...
			04BE	1232		ENBINT		:RESTORE IPL
	10	11	04C2	1233	258:	BRB	508	:DON'T WAIT FOR A SECOND INTERRUPT
			04C5	1234		WFIKPC	RETREG,#10	:WAIT FOR COMPLETION (CHANNEL RELEASED)
			04C7	1235	308:	IOFORK		:DROP TO FORK IPL
01D6		31	04D1	1236	408:	BRW	RETREG	:SEEK COMPLETION
			04D7	1237	508:			
			04DA	1238				

```

04DA 1240      .SBTTL  TRANSFER FUNCTION EXECUTION
04DA 1241
04DA 1242
04DA 1243      : TRANSFER FUNCTION EXECUTION
04DA 1244
04DA 1245      : FUNCTIONS INCLUDE:
04DA 1246
04DA 1247          WRITE CHECK
04DA 1248          WRITE DATA
04DA 1249          READ DATA, AND
04DA 1250          READ HEADER
04DA 1251
04DA 1252      : INPUTS:
04DA 1253          R3      - CASE INDEX
04DA 1254          R4      - DEVICE CSR ADDRESS
04DA 1255          R5      - UCB ADDRESS
04DA 1256
04DA 1257      : FUNCTIONAL DESCRIPTION:
04DA 1258
04DA 1259      : THE TRANSFER PARAMETERS ARE LOADED INTO THE DEVICE REGISTERS, INTERRUPTS
04DA 1260      : ARE LOCKED OUT, THE FUNCTION IS INITIATED, AND A WAITFOR INTERRUPT AND
04DA 1261      : KEEP CHANNEL IS EXECUTED.
04DA 1262
04DA 1263      : UPON RETURN FROM THE INTERRUPT SERVICE ROUTINE, IF THE TRANSFER IS
04DA 1264      : COMPLETE, THE APPROPRIATE EXIT IS TAKEN. IF THE FUNCTION IS NOT COMPLETE
04DA 1265      : TRANSFER PARAMETERS ARE UPDATED AND A RETURN TO FDISPATCH IS EXECUTED TO
04DA 1266      : RE-ISSUE SEEK AND TRANSFER FUNCTIONS WHILE KEEPING CHANNEL AND UBA
04DA 1267      : RESOURCES. IF A DATA CHECK HAS BEEN REQUESTED, IT IS PERFORMED
04DA 1268      : BEFORE RETURNING TO FDISPATCH.
04DA 1269
04DA 1270
04DA 1271      XFER:                                : TRANSFER FUNCTION EXECUTION
04DA 1272
04DA 1273      : LOAD UBA MAPS
04DA 1274
04DA 1275      : MOVW      UCBSW_BCR(R5),-          : GET BYTES LEFT TO TRANSFER AND -
04DE 1276      : UCBSW_BCNT(R5)                : ASSUME ONLY ONE TRANSFER NEEDED
04E0 1277      : CMPB      #CDF_READHEAD,R3      : IS THIS A READ HEADER OPERATION
04E3 1278      : BEQL      NOMAPS                : BRANCH IF SO, DON'T NEED MAPS
04E5 1279
04E5 1280
04E5 1281
04E5 1282      : COMPUTE SIZE OF THIS TRANSFER -- MAXIMUM = 1 TRACK
04E5 1283
04E5 1284      : MOVZBL UCBSB_SECTORS(R5),R2          : GET SECTORS/SURFACE
04E9 1285      : SUBB      UCBSW_DA(R5),R2        : CALCULATE SECTORS LEFT ON SURFACE
04EE 1286      : MULW      #256,R2                : COMPUTE BYTES REMAINING ON SURFACE
04F3 1287      : BDRVTYP  RB02,10$                : BRANCH IF AN RB02
04F9 1288      : MULW      #2,R2                  : RB80 HAS 512 BYTE SECTORS
04FC 1289      : BBC       #10$V_SKIPSECTINH,-    : BRANCH NO SKIP SECTOR INHIBIT
04FE 1290      : UCBSW_FUNC(R5),10$              :
0502 1291      : ADDW      #512,R2                  : ALLOW ACCESS TO 32ND SECTOR
0507 1292      : CMPW      UCBSW_BCNT(R5),R2        : ARE ADDITIONAL TRANSFERS REQUIRED?
0508 1293      : BLEQU     20$                        : BRANCH IF NOT
050D 1294      : MOVW      R2,UCBSW_BCNT(R5)        : STORE PARTIAL TRANSFER BYTE COUNT
0511 1295      : LOADUBAA                               : LOAD UNIBUS MAP REGISTERS
0517 1296

```

```
0517 1297 :  
0517 1298 : MAPS LOADED (IF NECESSARY) AND BYTE COUNT DETERMINED.  
0517 1299 : LOAD BYTE COUNT  
0517 1300 :  
0517 1301 :  
0517 1302 : NOMAPS:  
0517 1303 : DSBINT UCB$B_DIPL(R5) :SAVE IPL AND LOCK OUT DEVICE INTERRUPTS  
051E 1304 : MOVZWL UCB$W_BCNT(R5),R2 :FETCH BYTE COUNT  
0522 1305 : MNEGL R2,RB_BC(R4) :SET NEGATIVE BYTE COUNT  
0526 1306 :  
0526 1307 :  
0526 1308 :  
0526 1309 : COMPUTE AND LOAD 18 BIT UNIBUS ADDRESS  
0526 1310 :  
0526 1311 :  
50 7C A5 3C 0526 1312 : MOVZWL UCB$W_BOFF(R5),R0 :FETCH BYTE OFFSET  
51 24 A5 D0 052A 1313 : MOVL UCB$L_CRB(R5),R1 :GET CRB ADDRESS  
34 A1 F0 052E 1314 : INSV CRB$L_INTD+VECB$W_MAPREG(R1),- :INSERT STARTING MAP REGISTER  
50 09 09 0531 1315 : #9,#9,R0 :...NUMBER IN HIGH NINE BITS  
04 A4 50 D0 0534 1316 : MOVL R0,RB_BA(R4) :SET BUFFER ADDRESS  
0538 1317 :  
0538 1318 :  
0538 1319 :  
0538 1320 : PERFORM R80 TRACK-TO-TRACK SPIRALLING  
0538 1321 : THE R80 CAN CHANGE HEADS JUST BY LOADING A SEEK COMMAND,  
0538 1322 : AND LOADING THE DAR. WE TAKE ADVANTAGE OF THIS FEATURE  
0538 1323 : TO REDUCE SEEK TIMES  
0538 1324 :  
0538 1325 :  
0538 1326 :  
00BD C5 91 0540 1327 : GETUNIT :GET UNIT NUMBER IN R2  
00F3 C5 0544 1328 : CMPB UCB$L_MEDIA+1(R5),- :COMPARE DESIRED TRACK  
18 13 0547 1329 : UCB$L_DQ_CURDA+1(R5) :...TO CURRENT TRACK  
53 0E 91 0549 1330 : BEQL 20$ :BRANCH IF ON TRACK  
13 13 054C 1331 : CMPB #CDF_READHEAD,R3 :IS THIS A READ HEADER OPERATION?  
64 52 FAEE CF C9 054E 1332 : BEQL 20$ :BRANCH IF SO, DON'T CHANGE HEADS  
0C A4 00BC C5 D0 054E 1332 : BISL3 FTAB+<CDF_SEEK*4>,R2,- :SET CONTROLLER TO SEEK MODE  
00BD C5 90 0554 1333 : RB_CS(R4) :...  
00F3 C5 0554 1334 : MOVL UCB$L_MEDIA(R5),RB_DA(R4) :DO A HEAD SELECT  
055A 1335 : MOVB UCB$L_MEDIA+1(R5),- :UPDATE CURRENT DISK ADDRESS  
055E 1336 : UCB$L_DQ_CURDA+1(R5) :...WITH NEW TRACK  
0561 1337 :  
0561 1338 :  
0561 1339 : EXECUTE THE TRANSFER FUNCTION --  
0561 1340 : NOTE: THE FUNCTION MUST BE SPECIFIED BEFORE LOADING THE DAR  
0561 1341 : BECAUSE THE UCODE MUST KNOW WHETHER THE TRANSFER IS TO AN  
0561 1342 : RB02 OR AN RB80.  
0561 1343 :  
0561 1344 :  
0561 1345 20$: BBC #IOSV_SKPSECINH,- :BRANCH NO SKIP SECTOR INHIBIT  
0563 1346 : UCB$W_FUNC(R5),30$ :  
52 07 009A C5 0567 1347 : BISL #RB_CS_M_SSEI- :INHIBIT SKIP SECTOR ERRORS  
08400000 8F C8 056E 1348 : !RB-CS-M-ASSI,R2 :...AND AUTOMATIC SKIP SECTORING  
64 52 FAC5 CF43 C9 056E 1349 30$: BISL3 FTAB[R3],R2,RB_CS(R4) :LOAD UNIT NUMBER AND FUNCTION  
0575 1350 : CKPWR BRW RETREG :DISABLE INTERRUPTS, CHECK POWER  
0C A4 00BC C5 D0 0582 1351 : MOVL UCB$L_MEDIA(R5),RB_DA(R4) :SET DESIRED DISK ADDRESS  
0588 1352 : INITIATE :INITIATE THE FUNCTION  
058F 1353 : WFIKPC RETREG,#10 :WAITFOR INTERRUPT AND KEEP CHANNEL
```



```
0599 1354 :  
0599 1355 :THE R80 PRODUCES SPURIOUS ATTENTION BITS ON XFER'S. UNTIL FIXED WE  
0599 1356 :FOLLOW EACH TRANSFER WITH AN EXPLICIT CLEAR OF THE UNIT'S ATTENTION BIT.  
0599 1357 :  
51 0F 10 78 0599 1358 ASHL #RB_CS_V_ATN,#*XOF,R1 ;FORM BIT MASK  
50 54 A5 3C 059D 1359 MOVZWL UCBSW_UNIT(R5),R0 ;FETCH UNIT NUMBER  
00 50 10 C0 05A1 1360 ADDL #RB_CS_V_ATN,R0 ;POINT INTO MASK  
00 51 50 E5 05A4 1361 BBCC R0,R1,508 ;CLEAR THIS UNIT'S ATTENTION BIT  
64 51 CA 05A8 1362 508: BICL R1,RB_CS(R4) ;CLEAR THIS UNIT'S BIT IN THE CSR  
05AB 1363 IOFORK ;CREATE FORK PROCESS (RETURN TO ISR)  
0F E1 05B1 1364 BBC #RB_CS_V_CE,- ;BRANCH IF NO ERRORS  
03 00CC C5 05B3 1365 UCBSL_DQ_CS(R5),RETHDR ;  
00F6 31 05B7 1366 BRW_RETREG: ; WORD DISPLACEMENT, UNCONDITIONAL BRANCH  
05B7 1367 BRW RETREG ;RETURN REGISTERS  
05BA 1368
```

```
05BA 1370 .SBTTL TRANSFER POST PROCESSING
05BA 1371
05BA 1372
05BA 1373 : PURGE DATAPATH -- NOTE: THE DATAPATH IS NOT PURGED BECAUSE THIS
05BA 1374 : DRIVER IS SPECIFIC TO THE VAX730 PROCESS WHICH DOES NOT REQUIRE
05BA 1375 : DATAPATH PURGING. CONSEQUENTLY THE DATAPATH REGISTER WILL ALWAYS
05BA 1376 : BE ZERO IN ERRLOG AND DIAGNOSTIC BUFFERS.
05BA 1377 :
05BA 1378
05BA 1379
05BA 1380 :
05BA 1381 : RETURN HEADER INFORMATION FOR READ HEADER FUNCTION --
05BA 1382 : IF AN INTERNAL READY HEADER THEN SIMPLY EXIT.
05BA 1383 :
05BA 1384
05BA 1385 RETHDR:
05BA 1386 CMPB #CDF READHEAD, - ;RETURN HEADER INFO
05BF 1387 UCB$B_CEX(R5) ;WAS THIS A READ HEADER?
05BF 1388 BNEQ WRITECHK ;BRANCH IF NOT
05C1 1389 CMPB #IOS READHEAD, - ;INTERNAL READ HEADER?
05C6 1390 UCB$B_FEX(R5)
05C6 1391 BNEQ BRW_RETREG ;BRANCH IF SO
05C8 1392 PUSHL UCB$B_SVAPTE(R5) ;SAVE ADDRESS OF PTE
05CB 1393 MOVAB UCB$W_DQ_HDR1(R5),R1 ;SET ADDRESS OF INTERNAL BUFFER
05D0 1394 MOVL #6,R2 ;SET NUMBER OF BYTES TO MOVE
05D3 1395 CMPL R2,UCB$W_BCNT(R5) ;ROOM FOR FULL HEADER?
05D7 1396 BLEQU 30$ ;BRANCH IF SO
05D9 1397 MOVZWL UCB$W_BCNT(R5),R2 ;SET LENGTH OF PARTIAL HEADER
05DD 1398 SUBW2 R2,UCB$W_BCR(R5) ;UPDATE BYTE COUNT REMAINING
05E2 1399 JSB G^IOCSMOVTOUSER ;MOVE HEADER TO USER BUFFER
05E8 1400 POPL UCB$B_SVAPTE(R5) ;RESTORE ADDRESS OF PTE
05EC 1401 BRB BRW_RETREG ;TERMINATE FUNCTION
05EE 1402
```

0093 C5 OE 91 05BA 1386
0092 C5 OE 91 05BF 1387
78 A5 DD 05C6 1390
51 00EC C5 9E 05C8 1392
52 06 D0 05CB 1393
7E A5 S2 B1 05D0 1394
04 1B 05D3 1395
52 7E A5 3C 05D7 1396
00C0 C5 S2 A2 05D9 1397
00000000 GF 16 05DD 1398
78 A5 BED0 05E2 1399
C9 11 05E8 1400
05EC 1401
05EE 1402

```
.SBTTL DATA CHECK AND PARAMETER UPDATE

05EE 1404
05EE 1405
05EE 1406
05EE 1407 : PERFORM WRITE CHECK, IF REQUESTED
05EE 1408
05EE 1409
05EE 1410 WRITECHK: :WRITECHECK AFTER PARTIAL TRANSFER
11 009A 0E E1 05EE 1411 BBC #IOSV_DATACHECK,- :IF CLR - DATA CHECK NOT REQUESTED
01 C5 05F0 1412 UCBSW_FUNC(R5),UPDATE
00C9 01 E4 05F4 1413 BBSC #UCBSW_DQ_DIP,- :CLEAR DATA CHECK IN PROGRESS
08 C5 05F6 1414 UCBSB_DQ_FLAGS(R5),- :...AND BRANCH IF SET
02 08 05F9 1415 UPDATE :SET DATA CHECK IN PROGRESS
00C9 02 88 05FA 1416 BISB #UCBSM_DQ_DIP,-
53 0A 9A 05FC 1417 UCBSB_DQ_FLAGS(R5)
FF12 31 05FF 1418 MOVZBL #IOS_WRITECHECK,R3 :SET CASE INDEX TO WRITE CHECK
0602 1419 BRW NOMAPS :BRANCH TO PERFORM WRITE CHECK
0605 1420
0605 1421
0605 1422
0605 1423 : UPDATE BUFFER ADDRESS, CURRENT DISK ADDRESS, AND BYTES REMAINING
0605 1424 : FOR NEXT TRANSFER
0605 1425
0605 1426
0605 1427 UPDATE: :UPDATE TRANSFER PARAMETERS
50 7E A5 3C 0605 1428 MOVZWL UCBSW_BCNT(R5),R0 :FETCH BYTES TRANSFERRED
00C0 C5 50 A2 0609 1429 SUBW R0,UCBSW_BCR(R5) :UPDATE BYTES REMAINING TO XFER
A7 13 060E 1430 BEQL BRW_RETREG :BRANCH IF TRANSFER COMPLETE
0610 1431
0610 1432 : COMPUTE NUMBER OF 512 BYTE BLOCKS TRANSFERED
0610 1433
0610 1434
50 50 F9 8F 78 0610 1435 10$: ASHL #-7,R0,R0 :COMPUTE PAGES * 4
78 A5 50 C0 0615 1436 ADDL R0,UCBSL_SVAPTE(R5) :UPDATE THE ADDRESS OF THE PTE
78 A5 03 8A 0619 1437 BICB2 #^X3,UCBSL_SVAPTE(R5) :ROUND DOWN TO FULL PAGES (RL02'S!)
50 50 FF 8F 78 061D 1438 ASHL #-1,R0,R0 :CONVERT TO 256 BYTE SECTORS
0622 1439 BDRVTYP RB80,15$ :BRANCH IF RB80
OF 50 E9 0628 1440 BLBC R0,20$ :CHECK FOR ODD SECTOR ADDRESSING
7D A5 7D A5 96 062B 1441 INCB UCBSW_BOFF+1(R5) :ADD ^X100 TO BOFF
7D A5 FE 8F 8A 062E 1442 BICB #^XFE,UCBSW_BOFF+1(R5) :MAKE BOFF MODULO ^X200
05 11 0633 1443 BRB 20$ :CONTINUE IN COMMON
0635 1444
50 50 FF 8F 78 0635 1445 15$: ASHL #-1,R0,R0 :CONVERT TO 512 BYTE SECTORS
00BC C5 50 80 063A 1446 20$: ADDB R0,UCBSW_DA(R5) :UPDATE SECTOR
00BC C5 91 063F 1447 CMPB UCBSW_DAT(R5),- :COMPARE UPDATED SECTOR
44 A5 0643 1448 UCBSB_SECTORS(R5) :...TO SECTORS PER TRACK
28 1F 0645 1449 BLSSU 50$ :BRANCH IF MORE REMAIN
0E 12 0647 1450 BNEQ 30$ :BRANCH IF PAST LOGICAL END OF TRACK
0649 1451 BDRVTYP RB02,30$ :BRANCH IF RB02
02 009A 09 E1 064F 1452 BBC #IOSV_SKPSECTINH,- :BRANCH NO SKIP SECTOR INHIBIT
C5 0651 1453 UCBSW_FUNC(R5),30$ :...
0655 1454
0655 1455 :THIS IS AN R80 DRIVE, ON THE LAST LOGICAL SECTOR, AND SKIP SECTOR
0655 1456 :INHIBIT IS SET -- THERE IS ONE PHYSICALLY ACCESSABLE BLOCK REMAINING, SO
0655 1457 :CONTINUE ON THE SAME TRACK
0655 1458
18 11 0655 1459 BRB 50$ :ONE MORE SECTOR REMAINS
0657 1460
```

DODRIVER
V04-000

L 14
- VAX/VMS RB730:RB02/RB80 DISK DRIVER
DATA CHECK AND PARAMETER UPDATE

15-SEP-1984 23:49:22 VAX/VMS Macro V04-00
5-SEP-1984 00:12:46 [DRIVER.SRC]DODRIVER.MAR;1

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00BC	C5	94	0657	1461	308:	CLRB	UCBSW_DA(R5)	:CLEAR SECTOR ADDRESS
00BD	C5	96	0658	1462		INCB	UCBSW_DA+1(R5)	:INCREMENT TRACK
00BD	C5	91	065F	1463		CMPB	UCBSW_DA+1(R5) -	:COMPARE UPDATED TRACK
45	A5		0663	1464			UCBSB_TRACKS(R5)	:...TO TRACKS PER CYLINDER
	08	1F	0665	1465		BLSSU	508	:BRANCH IF MORE REMAIN
00BD	C5	94	0667	1466		CLRB	UCBSW_DA+1(R5)	:RESET DESIRED TRACK (SURFACE) TO 0
00BE	C5	86	0668	1467		INCB	UCBSW_DC(R5)	:INCREMENT CYLINDER
			066F	1468				
FB18		31	066F	1469	508:	BRW	FDISPATCH	:MORE BYTES REMAINING - CONTINUE
			0672	1470				


```
0672 1472 .SBTTL SPECIAL CONDITION (POWER, TIMEOUT)
0672 1473
0672 1474 :
0672 1475 : SPECIAL CONDITION EXIT (POWER FAILURE OR DEVICE TIMEOUT)
0672 1476 :
0672 1477 :
0672 1478 SPECOND:
0672 1479 MNEGL #1,UCBSL DQ CURDA(R5) ;DISABLE SEEK OPTIMIZATION
0677 1480 BBSC #UCBSV POWER, - ;IF SET - POWER FAILURE
0679 1481 UCBSW_STS(R5),PWRFAIL ;...ELSE TIMEOUT
067C 1482 SETIPL UCBSB-FIPL(R5) ;TIMEOUTS ENTER AT DEVICE IPL
0680 1483 JSB G^ERL$DEVICTMO ;LOG DEVICE TIMEOUT
0686 1484 CLRW UCBSW BCNT(R5) ;SET ZERO BYTES TRANSFERED
0689 1485 BICW #UCBSM TIMOUT,UCBSW_STS(R5) ;CLEAR TIMEOUT STATUS
068F 1486 MOVZWL #SS$ TIMEOUT,R0 ;SET DEVICE TIMEOUT STATUS
0694 1487 DECB UCBSB_ERTCNT(R5) ;ANY ERROR RETRIES REMAINING?
0698 1488 BLEQ 108 ;BRANCH IF NOT
069A 1489 BRW RESETDRIVE ;RETRY THE FUNCTION
069D 1490 108: BRW FUNCXT ;GIVE UP
06A0 1491
06A0 1492 PWRFAIL:
06A0 1493 BICW #UCBSM POWER,UCBSW_STS(R5) ;POWER FAILURE
06A4 1494 MOVL UCBSL_IRP(R5),R3 ;CLEAR POWER FAILURE BIT
06A8 1495 MOVQ IRPSL_SVAPTE(R3),- ;GET ADDRESS OF I/O PACKET
06AB 1496 UCBSL_SVAPTE(R5) ;RESTORE TRANSFER PARAMETERS
06AD 1497 BRW PREPROCESS ;RETURN TO PREPROCESS UCB FIELDS
0680 1498
```

00F2 C5 01 CE
05 E4
24 64 A5
00000000 GF 16
7E A5 B4
64 A5 0040 8F AA
50 022C 8F 3C
0080 C5 97
03 15
FC1B 31
FCB1 31
64 A5 20 AA
53 58 A5 D0
2C A3 7D
78 A5
FA6B 31

```
.SBTTL  HARDWARE FUNCTION EXIT PROCESSING

06B0 1500
06B0 1501
06B0 1502
06B0 1503 : DETERMINE EXIT - SPECIAL CONDITION, FATAL ERROR, RETRIABLE ERROR, OR SUCCESS
06B0 1504 :
06B0 1505
06B0 1506 RETREG: BITW      #UCBSM_POWER!-      :POWER FAIL
06B1 1507      UCBSM_TIMEOUT-      :...OR DEVICE TIMEOUT
06B1 1508      UCBSM_STS(R5)      :...IN STATUS WORD?
06B6 1509      BNEQ      SPECORD      :BRANCH IF SO -- SPECIAL CONDITION
06B8 1510      MOVL      UCBSL_DQ_CS(R5),R1      :FETCH CSR
06BD 1511      BBC      #RB_CS_V_CE,R1,SUCCESS :BRANCH IF NO ERRORS
06C1 1512      MNEGL     #1,UCBSL_DQ_CURDA(R5)    :DISABLE SEEK OPTIMIZATION
06C6 1513      ADDW      UCBSL_DQ_BCTR5),-      :ADD NEGATIVE BYTE COUNT REMAINING
06CA 1514      UCBSM_BCTR(R5)      :TO PARTIAL TRANSFER COUNT
06CC 1515      MOVL      UCBSL_DQ_MP(R5),R2      :FETCH MPR
06D1 1516
06D1 1517 :
06D1 1518 : CHECK TO SEE IF THERE IS ANY ERROR OTHER THAN OPI. IF NO OTHER
06D1 1519 : ERRORS, AND THE DRIVE IS NOT READY, THEN ASSUME IT WAS SIMPLY SPUN DOWN
06D1 1520 :
06D1 1521      BITL      #RB_CS_M_SSE -      :SKIP SECTOR ERROR
06D8 1522      !RB_CS_M_DE -      :... OR DRIVE ERROR
06D8 1523      !RB_CS_M_NXM -      :... OR NON-EXISTANT MEMORY
06D8 1524      !RB_CS_M_DLT -      :... OR DATA LATE
06D8 1525      !RB_CS_M_DCK -      :... OR DATA CHECK
06D8 1526      !RB_CS_M_DRDY,R1      :... OR DRIVE READY?
06D8 1527      BNEQ      20$      :BRANCH IF SO
06DA 1528      BBCC      #UCBSV_VALID,-      :CLEAR VALID BIT
06DC 1529      UCBSM_STS(R5),15$      :
06DF 1530      MOVZWL     #SS$_MEDOFL,R0      :SET MEDIUM OFFLINE STATUS
06E4 1531      BRW      FUNCXT      :RETURN
06E7 1532
06E7 1533      JSB      G*ERL$DEVICERR      :ALLOCATE AND FILL ERROR MESSAGE BUFFER
06ED 1534      BBS      #RB_CS_V_NXM,R1,FATAL :BRANCH IF NON-EXISTENT MEMORY
06F1 1535      BBS      #RB_CS_V_SSE,R1,FATAL :BRANCH IF SKIP SECTOR ERROR
06F5 1536      BBC      #RB_CS_V_DE,R1,RETRY :BRANCH IF NO DRIVE ERRORS
06F7 1537      BDRVTYP RB02,50$      :BRANCH IF RB02
06FF 1538
06FF 1539 :
06FF 1540 : CLASSIFY RB80 ERRORS AS FATAL OR RETRIABLE
06FF 1541 :
06FF 1542
06FF 1543      BBC      #RB_MP_V_PLGV,R2,10$      :BRANCH IF PLUG NOT VALID
0703 1544      BRB      RETRY      :
0705 1545
0705 1546 :
0705 1547 : CLASSIFY RB02 ERRORS AS FATAL OR RETRIABLE
0705 1548 :
0705 1549      CMPZV     #0,#6,R2,-      :STATE OK? ...COVER CLOSED
070A 1550      #RB_MP_M_HO-      :...HEADS OUT
070A 1551      !RB_MP_M_BH-      :...BRUSHES HOME
070A 1552      !RB_MP_C_SLM      :...READY TO GO
070A 1553      BNEQ      10$      :BRANCH IF NOT
070C 1554
070C 1555      BBC      #RB_MP_V_VC,R2,60$      :BRANCH IF VOLUME VALID
0710 1556      BBCC      #UCBSV_VALID,-      :CLEAR VALID BIT
```

```
00 64 A5 0712 1557 UCB$W_STS(R5),55$ ;RETURN
      2D 11 0715 1558 55$: BRB FATAL ;RETURN
      0717 1559
04 52 0D E1 0717 1560 60$: BBC #RB_MP-V-WL,R2,70$ ;BRANCH IF NOT WRITE LOCKED
25 52 0A E0 0718 1561 BBS #RB_MP-V-WGE,R2,FATAL ;IF WL & WGE THEN WL ERROR
52 0000CD00 8F D3 071F 1562 70$: BITL #RB_MP-M-WDE- ;WRITE DATA ERROR
      0726 1563 ;RB_MP-M-HCE- ;...OR HEAD CURRENT ERROR
      0726 1564 ;RB_MP-M-SPD- ;...OR SPINDLE SPEED ERROR
      0726 1565 ;RB_MP-M-WGE- ;...OR WRITE GATE ERROR
      0726 1566 ;RB_MP-M-DSE,R2 ;...OR DRIVE SELECT ERROR?
      1C 12 0726 1567 BNEQ FATAL ;BRANCH IF SO
      0728 1568
      0728 1569 ; RETRIABLE ERROR EXIT
      0728 1570
      0728 1571
      0728 1572
      0728 1573 RETRY: BBS #IOSV_INHRETRY,- ;BRANCH IF RETRIES INHIBITED
16 009A C5 E0 072A 1574 UCB$W_FUNC(R5),FATAL ;...
50 009C D5 98 072E 1575 ;CVTBL @UCB$C_DPC(R5),R0 ;GET BRANCH DISPLACEMENT
50 009C C5 C0 0733 1576 ADDL UCB$C_DPC(R5),R0 ;COMPUTE JUMP ADDRESS -1
      50 D6 0738 1577 INCL R0 ;COMPUTE JUMP ADDRESS
      60 17 073A 1578 JMP (R0) ;RETURN TO ERROR ROUTINE
      073C 1579
      073C 1580 ; SUCCESSFUL OPERATION EXIT
      073C 1581
      073C 1582
      073C 1583
009C C5 D6 073C 1584 SUCCESS:INCL UCB$C_DPC(R5) ;ADJUST TO CORRECT RETURN ADDRESS
009C D5 17 0740 1585 JMP @UCB$C_DPC(R5) ;RETURN TO DRIVER
      0744 1586
      0744 1587 ; FATAL ERROR EXIT
      0744 1588
      0744 1589
      0744 1590
FB7B 31 0744 1591 FATAL: BRW FATALERR ;FATAL ERROR EXIT
      0747 1592
```

```
0747 1594 .SBTTL INTERRUPT SERVICE ROUTINE
0747 1595
0747 1596 :++
0747 1597 DQ$INT - RB730 INTERRUPT SERVICE ROUTINE
0747 1598
0747 1599 FUNCTIONAL DESCRIPTION:
0747 1600
0747 1601 THIS ROUTINE IS ENTERED VIA A JSB INSTRUCTION WHEN AN INTERRUPT
0747 1602 OCCURS ON AN RB730 DISK CONTROLLER. IF THE INTERRUPT IS NOT EXPECTED,
0747 1603 THE UNSOLICITED INTERRUPT ROUTINE DISMISSES THE INTERRUPT. IF
0747 1604 THE INTERRUPT IS EXPECTED, DEVICE REGISTERS ARE SAVED AND THE
0747 1605 INTERRUPTING UNIT IS DETERMINED. THE DRIVER IS CALLED AT ITS INTERRUPT
0747 1606 RETURN ADDRESS. THE DRIVER FORKS, CAUSING A RETURN TO THIS ROUTINE
0747 1607 WHICH CONTINUES TO SCAN THE ATTENTION SUMMARY REGISTER IN CASE
0747 1608 ANY MORE DRIVES REQUIRE SERVICE. AFTER THE LAST DRIVE IS SERVICED
0747 1609 THIS ROUTINE RESTORES GENERAL REGISTERS AND DISMISSES THE INTERRUPT.
0747 1610
0747 1611 INPUTS:
0747 1612
0747 1613 00(SP) - POINTER TO ADDRESS OF THE IDB
0747 1614 04(SP) - SAVED R0
0747 1615 08(SP) - SAVED R1
0747 1616 12(SP) - SAVED R2
0747 1617 16(SP) - SAVED R3
0747 1618 20(SP) - SAVED R4
0747 1619 24(SP) - SAVED R5
0747 1620 28(SP) - PC AT THE TIME OF THE INTERRUPT
0747 1621 32(SP) - PSL AT THE TIME OF THE INTERRUPT
0747 1622
0747 1623 OUTPUTS:
0747 1624
0747 1625 DEVICE REGISTERS ARE SAVED, IPL IS LOWERED TO FORK LEVEL, THE
0747 1626 INTERRUPT IS DISMISSED, ALL REGISTERS EXCEPT R0-R5 ARE PRESERVED.
0747 1627
0747 1628 :--
0747 1629
0747 1630 DQ_REI:
0747 1631 ADDL #4,SP ; INTERRUPT EXIT CODE
074A 1632 POPR #^M<R0,R1,R2,R3,R4,R5> ; POP IDB ADDRESS
074C 1633 REI ; RESTORE R0-R5
074D 1634 ; RETURN FROM INTERRUPT
074D 1635 DQ_INT:
074D 1636 MOVL @ (SP),R3 ; INTERRUPT SERVICE ROUTINE
0751 1637 MOVL IDB$CSR(R3),R4 ; FETCH ADDRESS OF IDB
0754 1638 MOVL IDB$OWNER(R3),R5 ; GET ADDRESS OF CSR
0758 1639 BEQL 12$ ; GET OWNER UCB ADDRESS
075A 1640 BBSC #UCB$V_INT,- ; BRANCH IF NOT OWNED
075C 1641 UCBSW_ST$ (R5),40$ ; BRANCH IF INTERRUPT EXPECTED
075F 1642 :
075F 1643 : SCAN ATTENTION BITS TO DETERMINE INTERRUPTING DRIVE
075F 1644
075F 1645 10$: MOVL @ (SP),R3 ; FETCH ADDRESS OF IDB
0763 1646 MOVL IDB$CSR(R3),R4 ; GET ADDRESS OF CSR
0766 1647 12$: MOVL RB_CSTR4),R1 ; GET CSR
0769 1648 FFS #RB_CS_V_ATN,- ; FIND REQUESTING DRIVE
076B 1649 #RB_CS_S_ATN,R1,R1 ;
076E 1650 BEQL DQ_REI ; BRANCH IF NO MORE DRIVES TO SERVICE
```



```
50 0F 10 78 0770 1651 ASHL #RB_CS_V_ATN,#*XOF,R0 ;PREPARE MASK OF ATTENTION BITS
00 50 51 E5 0774 1652 BBCC R1,R0,T5$ ;CLEAR THIS UNIT'S BIT IN THE MASK
64 64 50 CA 0778 1653 15$: BICL R0,RB_CS(R4) ;CLEAR THIS UNIT'S BIT IN THE CSR
51 10 C2 077B 1654 SUBL #RB_CS_V_ATN,R1 ;COMPUTE UNIT NUMBER
52 51 08 78 077E 1655 ASHL #RB_CS_V_DS,R1,R2 ;MOVE UNIT INTO DRIVE SELECT BITS
52 52 C9 0782 1656 BISL3 R2 ;SELECT THE UNIT
0784 1657 #RB_CS_M_IE- ;...WITH INTERRUPT ENABLE
0784 1658 !RB_CS_M_CRDY,- ;...AND CONTROLLER READY
0784 1659 RB_CS(R4) ;...DEVICE CSR
64 000000C0 8F D0 078A 1660 MOVL ID$$_UCBLST(R3)[R1],R5 ;GET ADDRESS OF UCB
55 18 A341 13 078F 1661 BEQL 25$ ;BRANCH IF UCB WAS NOT FOUND
01 E4 0791 1662 BBSC #UCBSV_INT,- ;BRANCH IF INTERRUPT WAS EXPECTED
10 64 A5 0793 1663 UCBSW_STS(R5),40$ ;...
00CC C5 64 D0 0796 1664 MOVL RB_CSTR4),UCBS$_DQ_CS(R5) ;SAVE CSR
00 00 079B 1665 BBSC #UCBSV_DQ_SIP,- ;BRANCH IF SEEK IN PROGRESS
C5 00C9 C5 079D 1666 UCBS$_DQ_FLAGS(R5),12$ ;...AND CONTINUE SCANNING
00C8 30 07A1 1667 25$: BSBW DQ_UNEXINT ;HANDLE UNEXPECTED INTERRUPT
C0 11 07A4 1668 BRB 12$ ;CONTINUE SCANNING
07A6 1670
07A6 1671 ;
07A6 1672 ; HERE WHEN UNIT DETERMINED, INTERRUPT EXPECTED, DRIVE SELECTED
07A6 1673 ; AND STATUS AVAILABLE
07A6 1674 ;
0093 C5 0E 91 07A6 1675 40$: CMPB #CDF_READHEAD,UCBS$_CEX(R5) ;READ HEADER FUNCTION?
12 12 07AB 1676 BNEQ 50$ ;IF NEQ - NO
00EC C5 10 A4 F7 07AD 1677 CVTLW RB_MP(R4),UCBSW_DQ_HDR1(R5) ;SAVE SECTOR HEADER INFORMATION
00EE C5 10 A4 F7 07B3 1678 CVTLW RB_MP(R4),UCBSW_DQ_HDR2(R5) ;... (THIS MUST BE DONE EVEN
00FO C5 10 A4 F7 07B9 1679 CVTLW RB_MP(R4),UCBSW_DQ_HDR3(R5) ;...FOR INTERNAL READ HEADERS)
07BF 1680
64 00008000 8F D3 07BF 1681 50$: BITL #RB_CS_M_CE,RB_CS(R4) ;COMPOSITE ERROR?
14 12 07C6 1682 BNEQ 80$ ;BRANCH IF SO
01 E0 07C8 1683 BBS #UCBSV_DIAGBUF,- ;BRANCH IF DIAGNOSTIC BUFFER
0F 68 A5 07CA 1684 UCBSW_DEVSTS(R5),80$ ;...IS PRESENT
00CC C5 64 D0 07CD 1685 MOVL RB_CSTR4),UCBS$_DQ_CS(R5) ;SAVE CSR ONLY
07D2 1686
07D2 1687 ;
07D2 1688 ; RETURN TO FUNCTION EXECUTION
07D2 1689 ;
53 10 A5 7D 07D2 1690 60$: MOVQ UCBS$_FR3(R5),R3 ;RESTORE DRIVER CONTEXT
OC B5 16 07D6 1691 JSB @UCBS$_FPC(R5) ;CALL DRIVER AT INTERRUPT RETURN ADDRESS
FF83 31 07D9 1692 BRW 10$ ;CHECK FOR MORE DRIVES TO SERVICE
07DC 1693
07DC 1694 ;
07DC 1695 ; DEVICE ERROR OR DIAGNOSTIC BUFFER -- SAVE THE DEVICE REGISTERS
07DC 1696 ; AND RESET THE DRIVE
07DC 1697 ;
02 10 07DC 1698 80$: BSBB DQ_REGSAVE ;SAVE DEVICE REGISTERS
F2 11 07DE 1699 BRB 60$ ;CONTINUE
07E0 1700
```

```
07E0 1702 .SBTTL REGISTER SAVE ROUTINE
07E0 1703 :++
07E0 1704 :
07E0 1705 DQ_REGSAVE - REGISTER SAVE ROUTINE
07E0 1706 :
07E0 1707 FUNCTIONAL DESCRIPTION:
07E0 1708 :
07E0 1709 THIS ROUTINE IS CALLED TO SAVE THE DEVICE REGISTERS AND UBA RESOURCE
07E0 1710 REGISTERS IN THE UCB. STATUS IS OBTAINED FROM THE DRIVE AND IF AN
07E0 1711 ERROR HAS OCCURED THEN THE DRIVE IS RESET (COULD BE HERE BECAUSE
07E0 1712 DIAGNOSTIC BUFFER PRESENT.
07E0 1713 :
07E0 1714 INPUTS:
07E0 1715 :
07E0 1716 R4 - ADDRESS OF DEVICE CONTROL STATUS REGISTER (CSR)
07E0 1717 R5 - ADDRESS OF UNIT CONTROL BLOCK (UCB)
07E0 1718 :
07E0 1719 OUTPUTS:
07E0 1720 :
07E0 1721 R0-R3 - DESTROYED
07E0 1722 THE DEVICE REGISTERS ARE SAVED IN THE UCB.
07E0 1723 :
07E0 1724 :--
07E0 1725 :
07E0 1726 DQ_REGSAVE:
07E0 1727 :REGISTER SAVE ROUTINE
53 52 64 9E 07E0 1727 MOVAB RB CS(R4),R2 ;GET ADDRESS OF CONTROL STATUS REGISTER
00CC C5 9E 07E3 1728 MOVAB UCB$DQ_CS(R5),R3 ;GET ADDRESS OF REGISTER SAVE AREA
83 82 DO 07E8 1729 MOVL (R2)+,(R3)+ ;SAVE CONTROL STATUS REGISTER
83 82 DO 07EB 1730 MOVL (R2)+,(R3)+ ;SAVE BUFFER ADDRESS REGISTER
83 82 DO 07EE 1731 MOVL (R2)+,(R3)+ ;SAVE BYTE COUNT REGISTER
83 82 DO 07F1 1732 MOVL (R2)+,(R3)+ ;SAVE DISK ADDRESS REGISTER
83 82 DO 07F4 1733 MOVL (R2)+,(R3)+ ;SAVE MPR REGISTER
00C4 C5 82 F7 07F7 1734 CVTLW (R2)+,UCB$W_EC1(R5) ;SAVE ECC POSITION REGISTER
00C6 C5 82 F7 07FC 1735 CVTLW (R2)+,UCB$W_EC2(R5) ;SAVE ECC PATTERN REGISTER
0801 1736 :
0801 1737 : GET STATUS
0801 1738 :
0801 1739 GETUNIT ;GET UNIT NUMBER IN R2
ED 0809 1740 CMPZV #RB_CS_V_FCODE,- ;WAS ORIGIANL FUNCTION A GET STATUS?
080B 1741 #RB_CS_S_FCODE,- ;...
080C 1742 UCB$DQ_CS(R5),- ;...
080F 1743 #F_GETSTATUS ;...
0810 1744 BEQL 20$ ;BRANCH IF SO (USE ORIGINAL STATUS)
00DC C5 FF 8F 9A 0812 1745 MOVZBL #-1,UCB$DQ_MP(R5) ;SET TO -1 IF GET STATUS FAILS
00A6 30 0818 1746 BSBW DQ_GETSTS ;GET THE STATUS
00DC C5 06 50 E9 081B 1747 BLBC R0,20$ ;BRANCH IF GET STATUS FAILED
00DC C5 10 A4 DO 081E 1748 MOVL RB MP(R4),UCB$DQ_MP(R5) ;SAVE MPR (STATUS WORD)
03 00CC C5 0F E1 0824 1749 20$: BBC #RB_CS_V_EC,- ;BRANCH IF NO ERRORS (DON'T CLEAR IF
008E 30 0826 1750 UCB$DQ_CS(R5),30$ ;...ONLY HERE FOR DIAGNOSTIC BUFFER)
082A 1751 BSBW DQ_RESET ;CLEAR DRIVE ERRORS IF ANY
082D 1752 :
082D 1753 :
082D 1754 : SAVE UBA REGISTERS
082D 1755 :
082D 1756 :
082D 1757 :
082D 1758 30$: ASSUME UCB$DQ_FMPR EQ UCB$DQ_MP+4 ;ASSUME REGISTER AREA CONTIG
```

63	00000000	FFFFFFFF	8F	7D	082D	1759	MOVQ	#-1,(R3)	;SET DEFAULT VALUE -1
			0A	91	0838	1760	CMPB	#CDF_WRITECHECK,-	;DRIVE RELATED FUNCTION?
		0093	C5		083A	1761		UCBSB_CEX(R5)	
			2C	1A	083D	1762	BGTRU	708	;BRANCH IF SO
					083F	1763			
50	00D0	C5	F7	8F	78	083F	ASHL	#-9,UCBSL_DQ_BA(R5),R0	;COMPUTE MAP REGISTER NUMBER
	50	01EF	8F	B1	0846	1765	CMPW	#495,R0	;LEGAL MAP REGISTER NUMBER?
			1E	1F	084B	1766	BLSSU	708	;BRANCH IF NOT
					084D	1767			
		51	24	A5	D0	084D	MOVL	UCBSL_CRB(R5),R1	;FETCH CRB
		52	38	B1	D0	0851	MOVL	@CRBSL_INTD+VECSL_ADP(R1),R2	;FETCH ADDRESS OF ADAPTOR CSR
83	0800	C240		D0	0855	1770	MOVL	UBISL_MAP(R2)(R0),(R3)+	;SAVE FINAL MAP REGISTER
				D7	085B	1771	DECL	R0	;CALCULATE PREVIOUS MAP REGISTER NUMBER
				EC	085D	1772	CMPV	#VECSW_MAPREG,-	;COMPARE STARTING MAP REGISTER NUMBER
			OF		085F	1773		#VECSS_MAPREG,-	
		34	A1		0860	1774		CRBSL_INTD+VECSW_MAPREG(R1),-	;...FROM CRB
			50		0862	1775		R0	;...TO ENDING MAP REGISTER MINUS 1
			06	14	0863	1776	BGTR	708	;BRANCH IF WE'RE STILL ON FIRST MAP
63	0800	C240		D0	0865	1777	MOVL	UBISL_MAP(R2)(R0),(R3)	;SAVE PREVIOUS MAP REGISTER
				05	0868	1778	RSB		;RETURN
					086C	1779			

```
086C 1781 .SBTTL UNEXPECTED INTERRUPT HANDLER
086C 1782 :++
086C 1783 :
086C 1784 : FUNCTIONAL DESCRIPTION:
086C 1785 :
086C 1786 : UNEXPECTED INTERRUPTS ARE FIELDDED. STATUS IS OBTAINED FROM
086C 1787 : THE DRIVE, VOLUME VALID IS CLEARED IF APPROPRIATE AND THE
086C 1788 : DRIVE IS RESET
086C 1789 :
086C 1790 : INPUTS:
086C 1791 :
086C 1792 : R2 - UNIT NUMBER OF DRIVE
086C 1793 : R4 - RB730 CSR ADDRESS
086C 1794 : R5 - UCB ADDRESS
086C 1795 :
086C 1796 : OUTPUTS:
086C 1797 :
086C 1798 : R0 - DESTROYED
086C 1799 : UCB$V_VALID IN UCB$W_STS
086C 1800 :
086C 1801 :--
086C 1802 :
086C 1803 DQ_UNEXINT: ;UNEXPECTED INTERRUPT
086C 1804 TSTL R5 ;IS THERE AN UCB?
086E 1805 BEQL 50$ ;BRANCH IF NOT
0870 1806
0870 1807 BSBB DQ_GETSTS ;GET DRIVE STATUS
0872 1808 BLBC R0,20$ ;BRANCH IF TIMEOUT OR OPI
0875 1809 BISW #UCB$M_ONLINE,UCB$W_STS(R5) ;SET UCB STATUS VOLUME ONLINE
0879 1810
0879 1811 BITL #RB_CS_M_TYP,RB_CS(R4) ;IS THIS AN R80
0880 1812 BNEQ 10$ ;BRANCH IF SO
0882 1813 BITL #RB_MP_M_VC,RB_MP(R4) ;VOLUME CHECK?
088A 1814 BEQL 30$ ;BRANCH IF NOT
088C 1815 BRB 20$ ;SET VOLUME INVALID
088E 1816
088E 1817 10$: BITL #RB_MP_M_PLGV,RB_MP(R4) ;PLUG VALID?
0896 1818 BNEQ 30$ ;BRANCH IF SO
0898 1819
0898 1820 20$: BBCC #UCB$V_VALID,- ;CLEAR VALID BIT
089A 1821 UCB$W_STS(R5),30$ ;...
089D 1822
089D 1823 30$: BSBW DQ_CLASSIFY ;CLASSIFY DRIVE AND INIT UCB
08A0 1824
08A0 1825 50$: BSBB DQ_RESET ;RESET THE DRIVE
08A2 1826 RSB ;RETURN TO CALLER
08A3 1827
```

55	D5	086C	1804	TSTL	R5		
30	13	086E	1805	BEQL	50\$		
		0870	1806				
	4F	0870	1807	BSBB	DQ_GETSTS		
23	50	0872	1808	BLBC	R0,20\$		
64	A5	0875	1809	BISW	#UCB\$M_ONLINE,UCB\$W_STS(R5)		
	10	0879	1810				
64	04000000	0879	1811	BITL	#RB_CS_M_TYP,RB_CS(R4)		
	0C	0880	1812	BNEQ	10\$		
10	A4	00000200	0882	BITL	#RB_MP_M_VC,RB_MP(R4)		
	11	088A	1814	BEQL	30\$		
	0A	088C	1815	BRB	20\$		
		088E	1816				
10	A4	00000200	088E	1817	10\$: BITL	#RB_MP_M_PLGV,RB_MP(R4)	
	05	0896	1818	BNEQ	30\$		
		0898	1819				
	0B	0898	1820	20\$: BBCC	#UCB\$V_VALID,-		
00	64	089A	1821		UCB\$W_STS(R5),30\$		
		089D	1822				
	00DA	089D	1823	30\$: BSBW	DQ_CLASSIFY		
		08A0	1824				
	19	08A0	1825	50\$: BSBB	DQ_RESET		
		08A2	1826	RSB			
		08A3	1827				


```
08A3 1829 .SBTTL GET STATUS, RESET, READ HEADER
08A3 1830 :++
08A3 1831 :
08A3 1832 DQ_READHDR - READ HEADER (EITHER DRIVE)
08A3 1833 DQ_RESET - GET STATUS AND RESET ROUTINE
08A3 1834 DQ_GETSTS - GET STATUS ROUTINE
08A3 1835 :
08A3 1836 FUNCTIONAL DESCRIPTION:
08A3 1837 :
08A3 1838 THIS ROUTINE HANDLES NON-INTERRUPT DRIVEN DEVICE OPERATIONS INCLUDING:
08A3 1839 :
08A3 1840 RESET DRIVE
08A3 1841 GET STATUS
08A3 1842 READ HEADER
08A3 1843 :
08A3 1844 AFTER EXECUTING THE FUNCTION A WAIT FOR CONTROLLER READY IS DONE.
08A3 1845 THE WAIT WILL TIMEOUT IF CONTROLLER READY DOES NOT APPEAR WITHIN
08A3 1846 2 SECONDS
08A3 1847 :
08A3 1848 THIS ROUTINE SHOULD ONLY BE CALLED AT DEVICE IPL OR ABOVE
08A3 1849 :
08A3 1850 INPUTS:
08A3 1851 :
08A3 1852 R2 - UNIT NUMBER IN DRIVE SELECT BITS
08A3 1853 R4 - ADDRESS OF DEVICE CONTROL STATUS REGISTER (CSR)
08A3 1854 :
08A3 1855 OUTPUTS:
08A3 1856 :
08A3 1857 RB_MP(R4) - DRIVE STATUS IF DQ_GETSTS OR DQ_RESET
08A3 1858 RO - LOW BIT CLEAR IF A-TIMEOUT OR OPERATION INCOMPLETE
08A3 1859 :
08A3 1860 :
08A3 1861 :--
08A3 1862 :
08A3 1863 :
08A3 1864 TO READ A HEADER, THE COMMAND IS LOADED AND THE WAIT ROUTINE
08A3 1865 IS JUMPED TO.
08A3 1866 :
08A3 1867 THE RB730 HOST (VAX730) MICROCODE MAINTAINS AN INTERNAL RECORD
08A3 1868 OF THE CURRENT DISK CYLINDER FOR RB02'S. THIS REGISTER IS USED TO
08A3 1869 COMPUTE THE RELATIVE CYLINDER ADDRESSES REQUIRED BY THE DRIVE. THE
08A3 1870 CONTENTS OF THIS REGISTER MAY DISAGREE WITH THE ACTUAL DISK POSITION.
08A3 1871 :
08A3 1872 THE REGISTER IS RECALIBRATED BY DOING A READ HEADER. THE MICROCODE
08A3 1873 RELOADS THE REGISTER WITH THE CURRENT CYLINDER ADDRESS AS SPECIFIED
08A3 1874 IN THE HEADER WORD, WHEN THE MACRO CODE READS THE MPR.
08A3 1875 :
08A3 1876 :
08A3 1877 DQ_READHDR: ;DRIVE READ HEADER ENTRY
08A3 1878 BSBB DQ_WAIT ;MAKE SURE CONTROLLER FREE
08A3 1879 BLBS RO,10$ ;BRANCH IF SO
08A3 1880 RSB ;RETURN WITH RO LBC
08A3 1881 10$: BISL3 R2,- ;MERGE UNIT NUMBER
08A3 1882 ;...WITH FUNCTION
08A3 1883 ;...AND INTERRUPT ENABLE
08A3 1884 ;INTO CSR CLEARING CRDY
08A3 1885 BSBW DQ_WAIT ;WAIT FOR COMPLETION
```

3C 10 01 50 E8 05 52 C9 64 00000048 8F 002D 30

Address	Hex	Op	Op1	Op2	Op3	Op4	Op5	Op6	Op7	Op8	Op9	Op10	Op11	Op12	Op13	Op14	Op15	Op16	Op17	Op18	Op19	Op20	Op21	Op22	Op23	Op24	Op25	Op26	Op27	Op28	Op29	Op30	Op31	Op32	Op33	Op34	Op35	Op36	Op37	Op38	Op39	Op40	Op41	Op42	Op43	Op44	Op45	Op46	Op47	Op48	Op49	Op50	Op51	Op52	Op53	Op54	Op55	Op56	Op57	Op58	Op59	Op60	Op61	Op62	Op63	Op64	Op65	Op66	Op67	Op68	Op69	Op70	Op71	Op72	Op73	Op74	Op75	Op76	Op77	Op78	Op79	Op80	Op81	Op82	Op83	Op84	Op85	Op86	Op87	Op88	Op89	Op90	Op91	Op92	Op93	Op94	Op95	Op96	Op97	Op98	Op99	Op100	Op101	Op102	Op103	Op104	Op105	Op106	Op107	Op108	Op109	Op110	Op111	Op112	Op113	Op114	Op115	Op116	Op117	Op118	Op119	Op120	Op121	Op122	Op123	Op124	Op125	Op126	Op127	Op128	Op129	Op130	Op131	Op132	Op133	Op134	Op135	Op136	Op137	Op138	Op139	Op140	Op141	Op142	Op143	Op144	Op145	Op146	Op147	Op148	Op149	Op150	Op151	Op152	Op153	Op154	Op155	Op156	Op157	Op158	Op159	Op160	Op161	Op162	Op163	Op164	Op165	Op166	Op167	Op168	Op169	Op170	Op171	Op172	Op173	Op174	Op175	Op176	Op177	Op178	Op179	Op180	Op181	Op182	Op183	Op184	Op185	Op186	Op187	Op188	Op189	Op190	Op191	Op192	Op193	Op194	Op195	Op196	Op197	Op198	Op199	Op200	Op201	Op202	Op203	Op204	Op205	Op206	Op207	Op208	Op209	Op210	Op211	Op212	Op213	Op214	Op215	Op216	Op217	Op218	Op219	Op220	Op221	Op222	Op223	Op224	Op225	Op226	Op227	Op228	Op229	Op230	Op231	Op232	Op233	Op234	Op235	Op236	Op237	Op238	Op239	Op240	Op241	Op242	Op243	Op244	Op245	Op246	Op247	Op248	Op249	Op250	Op251	Op252	Op253	Op254	Op255	Op256	Op257	Op258	Op259	Op260	Op261	Op262	Op263	Op264	Op265	Op266	Op267	Op268	Op269	Op270	Op271	Op272	Op273	Op274	Op275	Op276	Op277	Op278	Op279	Op280	Op281	Op282	Op283	Op284	Op285	Op286	Op287	Op288	Op289	Op290	Op291	Op292	Op293	Op294	Op295	Op296	Op297	Op298	Op299	Op300	Op301	Op302	Op303	Op304	Op305	Op306	Op307	Op308	Op309	Op310	Op311	Op312	Op313	Op314	Op315	Op316	Op317	Op318	Op319	Op320	Op321	Op322	Op323	Op324	Op325	Op326	Op327	Op328	Op329	Op330	Op331	Op332	Op333	Op334	Op335	Op336	Op337	Op338	Op339	Op340	Op341	Op342	Op343	Op344	Op345	Op346	Op347	Op348	Op349	Op350	Op351	Op352	Op353	Op354	Op355	Op356	Op357	Op358	Op359	Op360	Op361	Op362	Op363	Op364	Op365	Op366	Op367	Op368	Op369	Op370	Op371	Op372	Op373	Op374	Op375	Op376	Op377	Op378	Op379	Op380	Op381	Op382	Op383	Op384	Op385	Op386	Op387	Op388	Op389	Op390	Op391	Op392	Op393	Op394	Op395	Op396	Op397	Op398	Op399	Op400	Op401	Op402	Op403	Op404	Op405	Op406	Op407	Op408	Op409	Op410	Op411	Op412	Op413	Op414	Op415	Op416	Op417
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08E1 1929 .SBTTL WAIT FOR CONTROLLER READY
08E1 1930 :++
08E1 1931 :
08E1 1932 DQ_WAIT - WAIT FOR CONTROLLER READY ROUTINE
08E1 1933 :
08E1 1934 FUNCTIONAL DESCRIPTION:
08E1 1935 :
08E1 1936 THIS ROUTINE WAIT FOR CONTROLLER READY -- THE WAIT WILL TIMEOUT
08E1 1937 IF CONTROLLER READY DOES NOT APPEAR WITHIN 2 SECONDS
08E1 1938 :
08E1 1939 THIS ROUTINE SHOULD ONLY BE CALLED AT DEVICE IPL OR ABOVE
08E1 1940 :
08E1 1941 INPUTS:
08E1 1942 :
08E1 1943 R2 - UNIT NUMBER IN DRIVE SELECT BITS
08E1 1944 R4 - ADDRESS OF DEVICE CONTROL STATUS REGISTER (CSR)
08E1 1945 :
08E1 1946 OUTPUTS:
08E1 1947 :
08E1 1948 R0 - LOW BIT CLEAR IF A TIMEOUT
08E1 1949 :
08E1 1950 :
08E1 1951 :--
08E1 1952 :
08E1 1953 :
08E1 1954 WAIT FOR CONTROLLER READY. IF NOT PRESENT WITHIN APPROXIMATELY
08E1 1955 2 SECONDS, THEN R0 WILL HAVE LOW BIT CLEAR
08E1 1956 :
08E1 1957 DQ_WAIT:
08E1 1958 TIMEWAIT #200000, #RB_CS_M_CRDY, - ;WAIT FOR CONTROLLER READY
08E1 1959 RB_CS(R4), L ;WAIT FOR CONTROLLER READY
05 090C 1960 RSB ;... 200000*10 MICS
090D 1961 ;RETURN TO CALLER

```

```
090D 1963      .SBTTL  UNIT INITIALIZATION ROUTINE
090D 1964
090D 1965      **
090D 1966      :
090D 1967      DQ_UNIT_INIT - UNIT INITIALIZATION ROUTINE
090D 1968      :
090D 1969      FUNCTIONAL DESCRIPTION:
090D 1970      :
090D 1971      THIS ROUTINE READIES THE RB02/RB80 UNITS FOR I/O OPERATIONS.
090D 1972      :
090D 1973      THE OPERATING SYSTEM CALLS THIS ROUTINE:
090D 1974          - AT SYSTEM STARTUP
090D 1975          - DURING DRIVER LOADING
090D 1976          - DURING RECOVERY FROM POWER FAILURE
090D 1977      :
090D 1978      INPUTS:
090D 1979      :
090D 1980          R4      - CSR ADDRESS (CONTROLLER STATUS REGISTER)
090D 1981          R5      - UCB ADDRESS (UNIT CONTROL BLOCK)
090D 1982      :
090D 1983      OUTPUTS:
090D 1984      :
090D 1985      THE DRIVE IS RESET, UCB FIELDS ARE INITIALIZED, AND THE
090D 1986      ROUTINE WAITS FOR ONLINE UNITS TO SPIN UP.  ALL REGISTERS
090D 1987      EXCEPT R0-R3 ARE PRESERVED.  RB80'S ARE DIFFERENTIATED FROM
090D 1988      RB02 UNITS FOR UCB INITIALIZATION PURPOSES
090D 1989      :
090D 1990      A PERMANENT BUFFERED DATAPATH AND A PERMANENT SET OF MAP
090D 1991      REGISTERS ARE ALLOCATED ON THE FIRST CALL TO THIS ROUTINE.
090D 1992      ON SUCESSIVE ENTRYS, THE CALLS TO ALLOCATE RESOURCES ARE
090D 1993      IGNORED BY THE SYSTEM.
090D 1994      :
090D 1995      :--
090D 1996
090D 1997      DQ_UNIT_INIT:                                ;RB02/RB80 UNIT INITIALIZATION
090D 1998
090D 1999      :
090D 2000      : GET CURRENT DRIVE STATUS AND RESET DRIVE
090D 2001      :
090D 2002      MOVZWL  UCBSM_STS(R5),R3                      ;SAVE CURRENT UNIT STATUS
0911 2003      BICW    #UCBSM_ONLINE,UCBSM_VALID,-          ;ASSUME OFFLINE/INVALID
0915 2004      UCBSM_STS(R5)
0917 2005      GETUNIT
091F 2006      BSBB    DQ_WAIT                                ;LOAD UNIT NUMBER IN R2
0921 2007      BLBC    R0,50$                                ;WAIT FOR CONTROLLER
0924 2008      BSBW    DQ_RESET                                ;BRANCH IF CONTROLLER BUSY
0927 2009      BLBC    R0,50$                                ;GET STATUS AND RESET DRIVE
092A 2010
092A 2011      :
092A 2012      : WAIT FOR ONLINE UNITS TO SPIN UP
092A 2013      :
092A 2014      :
092A 2015      BBC     #UCBSV_VALID,R3,40$                  ;BYPASS SPINUP WAIT IF NOT
092E 2016      :
092E 2017      10$: BITL  #RB_CS_M_DRDY,RB_CS(R4)            ;...VALID BEFORE POWER FAIL
0931 2018      BNEQ    30$                                     ;IS DRIVE READY?
0933 2019      JSB     G*EXES$PWRTIMCHK                       ;BRANCH IF READY
0933 2019      :
0933 2019      : IS MAX TIME EXCEEDED?

53  64 A5  3C 090D 2002      MOVZWL  UCBSM_STS(R5),R3                      ;SAVE CURRENT UNIT STATUS
0810 8F  AA 0911 2003      BICW    #UCBSM_ONLINE,UCBSM_VALID,-          ;ASSUME OFFLINE/INVALID
64 A5  0915 2004      UCBSM_STS(R5)
C0 10 0917 2005      GETUNIT
26 50  E9 091F 2006      BSBB    DQ_WAIT                                ;LOAD UNIT NUMBER IN R2
FF94 30 0921 2007      BLBC    R0,50$                                ;WAIT FOR CONTROLLER
20 50  E9 0924 2008      BSBW    DQ_RESET                                ;BRANCH IF CONTROLLER BUSY
0927 2009      BLBC    R0,50$                                ;GET STATUS AND RESET DRIVE
092A 2010
092A 2011      :
092A 2012      : WAIT FOR ONLINE UNITS TO SPIN UP
092A 2013      :
092A 2014      :
092A 2015      BBC     #UCBSV_VALID,R3,40$                  ;BYPASS SPINUP WAIT IF NOT
092E 2016      :
092E 2017      10$: BITL  #RB_CS_M_DRDY,RB_CS(R4)            ;...VALID BEFORE POWER FAIL
0931 2018      BNEQ    30$                                     ;IS DRIVE READY?
00000000'GF 16 0933 2019      JSB     G*EXES$PWRTIMCHK                       ;BRANCH IF READY
0933 2019      :
0933 2019      : IS MAX TIME EXCEEDED?
```



```
      F2 50  E8 0939 2020      BLBS  R0,108      ;IF LBS - NO, STILL MORE TIME NEEDED
      06 11 093C 2021      BRB  408      ;POWER UP TIME EXCEEDED
      64 A5 0800 BF A8 093E 2022
      64 A5 10 A8 093E 2023 308: BLSW  #UCBSM_VALID,UCBSW_STS(R5)      ;SET UCB STATUS VOLUME VALID
      30 10 A8 0944 2024 408: BLSW  #UCBSM_ONLINE,UCBSW_STS(R5)      ;SET UCB STATUS VOLUME ONLINE
      10 0948 2025      BSBB  DQ_CLASSIFY      ;CLASSIFY DRIVE
      094A 2026
      094A 2027
      094A 2028
      094A 2029 : ALLOCATE A PERMANENT BUFFERED DATAPATH. (ON A VAX730, ALL DATAPATHS
      094A 2030 : ARE DIRECT. IT IS ALLOCATED HERE ONLY OUT OF CONVENTION.)
      094A 2031
      094A 2032 508: REQDPNW      ;REQUEST A PATH -- NO WAIT
      04 50  E8 0950 2033      BLBS  R0,558      ;BRANCH IF SUCCESSFUL
      51 24 A5 D0 0953 2034      BUG_CHECK UBMAPEXCED,FATAL      ;SERIOUS PROBLEM
      07 07 E2 0957 2035 558: MOVL  UCB$L_CRB(R5),R1      ;FETCH CRB ADDRESS
      00 37 A1 095B 2036      BBSS  #VEC$D_PATHLOCK,-      ;LOCK THE DATA PATH
      095D 2037      CRB$L_INTD+VEC$D_DATAPATH(R1),658 ;...IN THE CRB
      0960 2038
      0960 2039 :
      0960 2040 : ACCOCATE ENOUGH PERMANENT MAP REGISTERS TO HOLD THE LARGEST POSSIBLE
      0960 2041 : DATA TRANSFER. SINCE NEITHER THE RB02 OR RB80 SUPPORT SPIRALLING THE
      0960 2042 : LARGEST TRANSFER IS A SINGLE TRACK
      0960 2043
      0960 2044      32 (RB80 BLOCKS PER TRACK) +
      0960 2045      1 (IN CASE TRANSFER CROSSES PAGE BOUND) +
      0960 2046      1 (FOR INVALID SENTINAL PAGE)
      0960 2047      -- =
      0960 2048      34 PERMANENTLY ALLOCATED MAP REGISTERS
      0960 2049
      53 22  D0 0960 2050 658: MOVL  #34,R3      ;34 MAP REGISTERS NEEDED
      00000000 GF 16 0963 2051      JSB  G^IOCSALOUBAMAPN      ;REQUEST THEM
      0969 2052
      04 50  E8 0969 2053      BLBS  R0,678      ;BRANCH IF SUCCESSFUL
      096C 2054      BUG_CHECK UBMAPEXCED,FATAL      ;SERIOUS PROBLEM
      0970 2055
      51 24 A5 D0 0970 2056 678: MOVL  UCB$L_CRB(R5),R1      ;FETCH CRB ADDRESS
      07 07 E2 0974 2057      BBSS  #VEC$D_MAPLOCK,-      ;LOCK THE MAPS
      00 34 A1 0976 2058      CRB$L_INTD+VEC$D_MAPREG(R1),758 ;...IN THE CRB
      05 0979 2059 758: RSB      ;RETURN
      097A 2060
```

```
097A 2062 .SBTTL DRIVE CLASSIFICATION ROUTINE
097A 2063 **
097A 2064
097A 2065 DQ_CLASSIFY - DRIVE CLASSIFICATION ROUTINE
097A 2066
097A 2067 FUNCTIONAL DESCRIPTION:
097A 2068
097A 2069 THIS ROUTINE IS CALLED TO CLASSIFY THE DRIVE TYPE AND INITIALIZE
097A 2070 THE UCB FEILDS. IT IS CALLED AT DRIVE INIT TIME, AND FOLLOWING AN
097A 2071 UNEXPECT INTERRUPT.
097A 2072
097A 2073 INPUTS:
097A 2074
097A 2075 R4 - ADDRESS OF DEVICE CONTROL STATUS REGISTER (CSR)
097A 2076 R5 - ADDRESS OF UNIT CONTROL BLOCK (UCB)
097A 2077
097A 2078 OUTPUTS:
097A 2079
097A 2080 R0-R2 - DESTROYED
097A 2081 THE UCB FEILDS ARE INITIALIZED
097A 2082
097A 2083 --
097A 2084
097A 2085 DQ_CLASSIFY: ;DRIVE CLASSIFICATION ROUTINE
097A 2086
097A 2087 ASSUME THAT SECTORS, TRACKS, AND CYLINDERS FEILDS ARE CONTAINED IN
097A 2088 UCB$$_DEVDEPEND
097A 2089
097A 2090 ASSUME UCB$$_SECTORS EQ UCB$$_DEVDEPEND
097A 2091 ASSUME UCB$$_TRACKS EQ UCB$$_DEVDEPEND+1
097A 2092 ASSUME UCB$$_CYLINDERS EQ UCB$$_DEVDEPEND+2
097A 2093
097A 2094
097A 2095 ASSUME ITS AN RB02 AND INITIALIZE ACCORDINGLY
097A 2096
097A 2097 MOVB #DTS_RB02,UCB$$_DEVTYPE(R5) ;SET RB02 DEVICE TYPE AND
097E 2098 MOVL #<407<208>+<512016>>,- ;LOAD SECTORS+TRACKS+CYLINDERS
0984 2099 UCB$$_DEVDEPEND(R5) ;INTO UCB
0986 2100 MOVZWL #<20*2*512>,UCB$$_MAXBLOCK(R5) ;((512 BYTE) BLOCKS PER SPINDLE
098D 2101 MOVL #*X24642002,UCB$$_MEDIA_ID(R5) ;SET MEDIA IDENT "DQ RB02"
0996 2102 BISW2 #UCB$$_NOCNVRT,UCB$$_DEVSTS(R5) ;DISABLE LOG TO PHYS CONV.
099A 2103 GETUNIT ;PUT UNIT NUMBER IN R2
09A2 2104 BSBW DQ_READHDR ;READ HEADER TO SYNCRONIZE UCODE
09A5 2105
09A5 2106 BITL #RB_CS_M_TYP,RB_CS(R4) ;TEST DRIVE TYPE
09AC 2107 BEQL 30$ ;BRANCH IF AN RB02
09AE 2108
09AE 2109 MOVB #DTS_RB80,UCB$$_DEVTYPE(R5) ;SET RB80 DEVICE TYPE AND
09B2 2110 MOVL #<317<1408>+<559016>>,- ;LOAD SECTORS+TRACKS+CYLINDERS
09B8 2111 UCB$$_DEVDEPEND(R5) ;INTO UCB
09BA 2112 MOVL #<31*14*559>,UCB$$_MAXBLOCK(R5) ;((512 BYTE) BLOCKS PER SPINDLE
09C3 2113 MOVL #*X24642050,UCB$$_MEDIA_ID(R5) ;SET MEDIA IDENT "DQ RB80"
09CC 2114 BICW2 #UCB$$_NOCNVRT,UCB$$_DEVSTS(R5) ;ENABLE LOG TO PHYS CONV.
09D0 2115
09D0 2116 30$: RSB
09D1 2117
```

41 A5 12 90	02000228 8F D0	44 A5 3C	0080 C5 5000 8F D0	24642002 8F D0	68 A5 04 AB	FEFE 30	64 04000000 8F D3	22 13	41 A5 13 90	022F0E1F 8F D0	44 A5 09B8	0080 C5 0003B3AE 8F D0	24642050 8F D0	68 A5 04 AA	09D0 2115	05 09D0 2116	09D1 2117
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09D1 2119 .SBTTL CONTROLLER INITIALIZATION ROUTINE
09D1 2120 :++
09D1 2121
09D1 2122 FUNCTIONAL DESCRIPTION:
09D1 2123
09D1 2124 THE CORRECT RB730 CSR ADDRESS IS COMPUTED.
09D1 2125
09D1 2126 AUTOCONFIGURE UTILIZES A TEMPORARY UNIBUS CSR ADDRESS FOR
09D1 2127 CONFIGURING THIS CONTROLLER. THE TRUE CSR ADDRESS IS LOCATED
09D1 2128 EXACTLY ONE PAGE ABOVE THE ADAPTOR CSR (THE DEVICE REGISTERS
09D1 2129 ARE ACTUALLY IN THE ADAPTOR CONTROL REGISTER REGION)
09D1 2130
09D1 2131 THE OPERATING SYSTEM CALLS THIS ROUTINE:
09D1 2132 - AT SYSTEM STARTUP
09D1 2133 - DURING DRIVER LOADING
09D1 2134 - DURING RECOVERY FROM POWER FAILURE
09D1 2135
09D1 2136 INPUTS:
09D1 2137
09D1 2138 R4 - CSR ADDRESS (DEVICE CONTROL STATUS REGISTER)
09D1 2139 R5 - IDB ADDRESS (INTERRUPT DATA BLOCK)
09D1 2140 R6 - DDB ADDRESS (DEVICE DATA BLOCK)
09D1 2141 R8 - CRB ADDRESS (CHANNEL REQUEST BLOCK)
09D1 2142 ALL INTERRUPTS ARE LOCKED OUT
09D1 2143
09D1 2144 OUTPUTS:
09D1 2145
09D1 2146 IDB$$_CSR - CORRECT RB730 CSR ADDRESS
09D1 2147
09D1 2148 :--
09D1 2149
09D1 2150 DD_RB730 INIT: ;CONTROLLER INITIALIZATION
09D1 2151 ASSUME ADP$$_CSR EQ 0
09D1 2152 MOVL B1DB$$_ADP(R5),R0 ;FETCH ADAPTOR CSR ADDRESS
09D5 2153 MOVAL ^X200(R0),IDB$$_CSR(R5) ;STORE CSR IN IDB
09DA 2154 RSB
09DB 2155

```

50 14 B5 DO
65 0200 C0 DE
05

```
09DB 2157 .SBTTL UNIT DELIVERY ROUTINE
09DB 2158 :++
09DB 2159 :
09DB 2160 DQ_DELIVER - UNIT DELIVERY ROUTINE
09DB 2161 :
09DB 2162 FUNCTIONAL DESCRIPTION:
09DB 2163 :
09DB 2164 THIS ROUTINE IS CALLED BY AUTOCONFIGURE TO TEST FOR A UNITS
09DB 2165 PRESCENCE OR ABSCENCE ON THE CONTROLLER
09DB 2166 :
09DB 2167 INPUTS:
09DB 2168 :
09DB 2169 R0-R3 - SCRATCH
09DB 2170 R4 - ADDRESS OF ADAPTOR CONFIGURATION REGISTER
09DB 2171 R5 - UNIT NUMBER TO BE CONFIGURED
09DB 2172 R6 - ADDRESS OF CONFIGURATION CONTROL REGISTER
09DB 2173 R7 - ADDRESS OF CONFIGURATION CONTROL BLOCK (ACF BLOCK)
09DB 2174 R8 - ADDRESS OF ADAPTOR CONTROL BLOCK
09DB 2175 :
09DB 2176 ACF$B_CUNIT(R7) - UNIT NUMBER TO BE TESTED
09DB 2177 :
09DB 2178 OUTPUTS:
09DB 2179 :
09DB 2180 R0 - LBS IF UNIT FOUND, LBC IF NO SUCH UNIT
09DB 2181 :
09DB 2182 :--
09DB 2183 :
09DB 2184 DQ_DELIVER:
09DB 2185 PUSH R4
09DB 2186 MOVAB ^X200(R6),R4
09DB 2187 CLRL R2
09DB 2188 INSV R5,#8,#2,R2
09DB 2189 BSBW DQ_WAIT
09DB 2190 BLBC R0,50$
09DB 2191 BSBW DQ_GETSTS
09DB 2192 :
09DB 2193 50$: BICL #RB_CS_M_IE,RB_CS(R4)
09DB 2194 MOVL (SPT)+,R4
09DB 2195 RSB
09DB 2196 :
09DB 2197 :

54 0200 C6 DD 09DB 2185 PUSH R4
52 02 08 52 D4 09DB 2186 MOVAB ^X200(R6),R4
FEF5 30 09DB 2187 CLRL R2
03 50 F0 09DB 2188 INSV R5,#8,#2,R2
FECF 30 09DB 2189 BSBW DQ_WAIT
64 00000040 8F CA 09DB 2190 BLBC R0,50$
54 8E D0 09DB 2191 BSBW DQ_GETSTS
OS 09DB 2192 :
09DB 2193 50$: BICL #RB_CS_M_IE,RB_CS(R4)
09DB 2194 MOVL (SPT)+,R4
09DB 2195 RSB
09DB 2196 :
09DB 2197 :

;UNIT DELIVERY ROUTINE
;SAVE R4
;COMPUTE ADDRESS OF CSR
;PREPARE FOR UNIT NUMBER
;LOAD DRIVE SELECT BITS
;WAIT FOR CONTROLLER READY
;BRANCH IF CONTROLLER BUSY
;ATTEMPT GET STATUS
;R0=1 IF OK, 0 IF NO UNIT
;DISABLE INTERRUPTS
;RESTORE R4
;RETURN STATUS TO CALLER
```



```
09FD 2199 .SBTTL REGISTER DUMP ROUTINE
09FD 2200 :++
09FD 2201 :
09FD 2202 DQ_REGDUMP - REGISTER DUMP ROUTINE
09FD 2203 :
09FD 2204 FUNCTIONAL DESCRIPTION:
09FD 2205 :
09FD 2206 THIS ROUTINE IS CALLED TO SAVE THE DEVICE REGISTERS AND UBA RESOURCE
09FD 2207 REGISTERS IN A SPECIFIED BUFFER. IT IS CALLED FROM THE DEVICE ERROR
09FD 2208 LOGGING ROUTINE AND FROM THE DIAGNOSTIC BUFFER FILL ROUTINE.
09FD 2209 :
09FD 2210 INPUTS:
09FD 2211 :
09FD 2212 R0 - ADDRESS OF REGISTER SAVE BUFFER
09FD 2213 R4 - ADDRESS OF DEVICE CONTROL STATUS REGISTER (CSR)
09FD 2214 R5 - ADDRESS OF UNIT CONTROL BLOCK (UCB)
09FD 2215 :
09FD 2216 OUTPUTS:
09FD 2217 :
09FD 2218 THE DEVICE AND UBA REGISTERS ARE SAVED IN THE SPECIFIED BUFFER.
09FD 2219 R0 CONTAINS THE ADDRESS OF THE NEXT EMPTY LONGWORD IN THE BUFFER.
09FD 2220 ALL REGISTERS EXCEPT R1 AND R2 ARE PRESERVED.
09FD 2221 :
09FD 2222 :--
09FD 2223 :
09FD 2224 DQ_REGDUMP:
09FD 2225 MOVL #<RB_NUM_REGS+6>,(R0)+ ;REGISTER DUMP ROUTINE
51 80 0D D0 09FD 2226 MOVAL UCBS$C_DQ_CS(R5),R1 ;INSERT NUMBER OF REGISTERS
00CC C5 DE 0A00 2227 MOVZBL #<RB_NUM_REGS-2>,R2 ;GET ADDRESS OF SAVED DEVICE REGISTERS
52 05 9A 0A05 2228 10$: MOVL (R1)+,(R0)+ ;GET NUMBER OF DEVICE REGISTERS TO MOVE
80 81 D0 0A08 2229 SOBGTR R2,10$ ;DUMP REGISTER IN BUFFER
FA 52 F5 0A0B 2230 ;IF GTR - STILL MORE TO MOVE
0A0E 2231 :
80 00C4 C5 3C 0A0E 2232 MOVZWL UCBS$W_EC1(R5),(R0)+ ;ECC POSITION REGISTER
80 00C6 C5 3C 0A13 2233 MOVZWL UCBS$W_EC2(R5),(R0)+ ;ECC PATTERN REGISTER
0A18 2234 :
52 24 A5 D0 0A18 2235 MOVL UCBS$L_CRB(R5),R2 ;FETCH CRB ADDRESS
80 37 A2 9A 0A1C 2236 MOVZBL CRBS$L_INTD+VECSB_DATAPATH(R2),(R0)+ ;DUMP DATAPATH NUMBER
0A20 2237 CLRL (R0)+ ;DUMP DATAPATH REGISTER (ALWAYS 0)
80 81 D0 0A22 2238 MOVL (R1)+,(R0)+ ;DUMP FINAL MAP REGISTER
80 81 D0 0A25 2239 MOVL (R1)+,(R0)+ ;DUMP PREVIOUS MAP REGISTER
0A28 2240 :
80 34 A2 D0 0A28 2241 ASSUME VECSB_NUMREG EQ VECSW_MAPREG+2 ;ASSUME START AND NUMBER CONTIG
0A2C 2242 MOVL CRBS$L_INTD+VECSW_MAPREG(R2),(R0)+ ;DUMP MAP REGISTERS
80 00F6 C5 D0 0A2C 2243 MOVL UCBS$L_DQ_PREVDA(R5),(R0)+ ;DUMP PREVIOUS DISK ADDRESS
0A31 2244 :
05 0A31 2245 RSB ;RETURN
0A32 2246 :
0A32 2247 DQ_END: ;ADDRESS OF LAST LOCATION IN DRIVER
0A32 2248 .END
```

DQDRIVER
Symbol table

- VAX/VMS RB730:RB02/RB80 DISK DRIVER

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```

$$$ = 00000020 R 02
$$OP = 00000002
ACPSACCESS ***** X 03
ACPSDEACCESS ***** X 03
ACPSMODIFY ***** X 03
ACPSMOUNT ***** X 03
ACPSREADBLK ***** X 03
ACPSWRITEBLK ***** X 03
ADPSL_CSR = 00000000
APPLY_ECC = 000002A1 R 03
ATS_UBA = 00000001
AVAILABLE = 000001E2 R 03
BRW_RETREG = 000005B7 R 03
BUGS_UBMAPEXCED ***** X 03
CDF_AVAILABLE = 00000011
CDF_DRVCLR = 00000004
CDF_NOP = 00000000
CDF_OFFSET = 00000006
CDF_PACKACK = 00000008
CDF_READDATA = 0000000C
CDF_READHEAD = 0000000E
CDF_READTRACKD = 00000010
CDF_RECAL = 00000003
CDF_RELEASE = 00000005
CDF_RETCENTER = 00000007
CDF_SEEK = 00000002
CDF_STARTSPNDL = 00000009
CDF_UNLOAD = 00000001
CDF_WRITECHECK = 0000000A
CDF_WRITEDATA = 0000000B
CDF_WRITEHEAD = 0000000D
CDF_WRIETRACKD = 0000000F
CHECKECC = 00000235 R 03
CHECKOPI = 000008D3 R 03
CRBSL_INTD = 00000024
DCS_DISK = 00000001
DDBSL_PACK = 00000001
DDBSL_ACPD = 00000010
DDBSL_DDT = 0000000C
DEVSM_AVL = 00040000
DEVSM_DIR = 00000008
DEVSM_ELG = 00040000
DEVSM_FOD = 00004000
DEVSM_IDV = 04000000
DEVSM_NHM = 00000200
DEVSM_ODV = 08000000
DEVSM_RND = 10000000
DEVSM_SHR = 00010000
DPTSC_LENGTH = 00000038
DPTSC_VERSION = 00000004
DPT$INITAB = 00000038 R 02
DPT$M_SVP = 00000002
DPT$REINITAB = 0000006D R 02
DPT$TAB = 00000000 R 02
DQ$DDT = 00000000 RG 03
DQ_CLASSIFY = 0000097A R 03
DQ_DELIVER = 000009DB R 03

```

```

DQ_END = 00000A32 R 03
DQ_FUNCABLE = 00000080 R 03
DQ_GETSTS = 000008C1 R 03
DQ_INT = 0000074D R 03
DQ_RB730_INIT = 000009D1 R 03
DQ_READHDR = 000008A3 R 03
DQ_REGDUMP = 000009FD R 03
DQ_REGSAVE = 000007E0 R 03
DQ_REI = 00000747 R 03
DQ_RESET = 000008BB R 03
DQ_STARTIO = 00000114 R 03
DQ_UNEXINT = 0000086C R 03
DQ_UNIT_INIT = 0000090D R 03
DQ_WAIT = 000008E1 R 03
DRCLR = 00000398 R 03
DRVCLR = 000001F0 R 03
DTS_RB02 = 00000012
DTS_RB80 = 00000013
DYN$C_CRB = 00000005
DYN$C_DDB = 00000006
DYN$C_DPT = 0000001E
DYN$C_UCB = 00000010
EMBSL_DV_REGSAV = 0000004E
ERL$DEVICERR ***** X 03
ERL$DEVICTMO ***** X 03
EXESGL_TENUSEC ***** X 03
EXESGL_UBDELAY ***** X 03
EXESIOFORK ***** X 03
EXESLCLDSKVALID ***** X 03
EXESONEPARM ***** X 03
EXESPWRTIMCHK ***** X 03
EXESSENSEMODE ***** X 03
EXESSETCHAR ***** X 03
EXESZEROPARM ***** X 03
EXGETSTS = 000008C5 R 03
EX_IMED = 000003B0 R 03
FATAL = 00000744 R 03
FATALERR = 000002C2 R 03
FDISPATCH = 0000018A R 03
FEXL = 0000035A R 03
FTAB = 00000038 R 03
FUNCTAB_LEN = 00000094
FUNCXT = 00000321 R 03
F_AVAILABLE = 00000004
F_DRVCLR = 00000004
F_GETSTATUS = 00000004
F_NOP = 00000000
F_OFFSET = 00000000
F_PACKACK = 00000004
F_READDATA = 0000000C
F_READHEAD = 00000008
F_READTRACKD = 00000000
F_RECAL = 00000006
F_RELEASE = 00000000
F_RETCENTER = 00000C00
F_SEEK = 00000006
F_STARTSPNDL = 00000000

```

DQDRIVER
Symbol table

- VAX/VMS RB730:RB02/RB80 DISK DRIVER E 16

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F_UNLOAD	= 00000004		
F_WRITECHECK	= 00000002		
F_WRITEDATA	= 0000000A		
F_WRITEHEAD	= 00000000		
F_WRIETRACKD	= 00000000		
IDBSL_ADP	= 00000014		
IDBSL_CSR	= 00000000		
IDBSL_OWNER	= 00000004		
IDBSL_UCBLST	= 00000018		
IMMED	= 000003AD	R	03
IOSM_DATACHECK	= 00004000		
IOSV_DATACHECK	= 0000000E		
IOSV_INHRETRY	= 0000000F		
IOSV_SKPSECINH	= 00000009		
IOS_ACCESS	= 00000032		
IOS_ACPCONTROL	= 00000038		
IOS_AVAILABLE	= 00000011		
IOS_CREATE	= 00000033		
IOS_DEACCESS	= 00000034		
IOS_DELETE	= 00000035		
IOS_DRVCLR	= 00000004		
IOS_MODIFY	= 00000036		
IOS_MOUNT	= 00000039		
IOS_NOP	= 00000000		
IOS_PACKACK	= 00000008		
IOS_READHEAD	= 0000000E		
IOS_READBLK	= 00000021		
IOS_READPBLK	= 0000000C		
IOS_READVBLK	= 00000031		
IOS_RECAL	= 00000003		
IOS_SEEK	= 00000002		
IOS_SENSECHAR	= 0000001B		
IOS_SENSEMODE	= 00000027		
IOS_SETCHAR	= 0000001A		
IOS_SETHODE	= 00000023		
IOS_UNLOAD	= 00000001		
IOS_VIRTUAL	= 0000003F		
IOS_WRITECHECK	= 0000000A		
IOS_WRITEHEAD	= 0000000D		
IOS_WRI TELBLK	= 00000020		
IOS_WRITEPBLK	= 0000000B		
IOS_WRITEVBLK	= 00000030		
IOCSALOU BAMAPN	*****	X	03
IOCSAPPLYECC	*****	X	03
IOCSDIAGBUFILL	*****	X	03
IOCSLOADUBAMAPA	*****	X	03
IOCSMNTVER	*****	X	03
IOCSMOVTOUSER	*****	X	03
IOCSRELCHAN	*****	X	03
IOCSREQCOM	*****	X	03
IOCSREQDATAPNW	*****	X	03
IOCSREQPCHANL	*****	X	03
IOCSRETURN	*****	X	03
IOCSWFKPC	*****	X	03
IPLS_POWER	= 0000001F		
IRPSL_MEDIA	= 00000038		
IRPSL_SVAPTE	= 0000002C		

IRPSL_FCODE	= 00000006		
IRPSV_DIAGBUF	= 00000007		
IRPSV_FCODE	= 00000000		
IRPSV_PHYSIO	= 00000008		
IRPSW_BCNT	= 00000032		
IRPSW_FUNC	= 00000020		
IRPSW_STS	= 0000002A		
MASKH	= 00000008		
MASKL	= 04000000		
NOMAPS	= 00000517	R	03
NOP	= 000001E7	R	03
NORMAL	= 00000225	R	03
OFFSET	= 000001E7	R	03
PACKACK	= 000001D4	R	03
POSIT	= 00000421	R	03
PR\$ IPL	= 00000012		
PREPROCESS	= 0000011B	R	03
PWRFAIL	= 000006A0	R	03
RB_BA	= 00000004		
RB_BC	= 00000008		
RB_CMD	= 0000001C		
RB_CS	= 00000000		
RB_CS_M_ASSI	= 08000000		
RB_CS_M_ATN	= 000F0000		
RB_CS_M_CE	= 00008000		
RB_CS_M_CRDY	= 00000080		
RB_CS_M_DCK	= 00000800		
RB_CS_M_DE	= 00004000		
RB_CS_M_DLT	= 00001000		
RB_CS_M_DRDY	= 00000001		
RB_CS_M_FMT	= 20000000		
RB_CS_M_IE	= 00000040		
RB_CS_M_IR	= 01000000		
RB_CS_M_NXM	= 00002000		
RB_CS_M_OPI	= 00000400		
RB_CS_M_SSE	= 00800000		
RB_CS_M_SSEI	= 00400000		
RB_CS_M_TYP	= 04000000		
RB_CS_S_ATN	= 00000004		
RB_CS_S_ECS	= 00000002		
RB_CS_S_FCODE	= 00000003		
RB_CS_V_ATN	= 00000010		
RB_CS_V_CE	= 0000000F		
RB_CS_V_DCK	= 0000000B		
RB_CS_V_DE	= 0000000E		
RB_CS_V_DS	= 00000008		
RB_CS_V_ECS	= 00000014		
RB_CS_V_FCODE	= 00000001		
RB_CS_V_NXM	= 0000000D		
RB_CS_V_OPI	= 0000000A		
RB_CS_V_SSE	= 00000017		
RB_DA	= 0000000C		
RB_EC1	= 00000014		
RB_EC2	= 00000018		
RB_MP	= 00000010		
RB_MP_C_SLM	= 00000005		
RB_MP_M_BH	= 00000008		

DQDRIVER
Symbol table

F 16
- VAX/VMS RB730:RB02/RB80 DISK DRIVER

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RB_MP_M_DSE	= 00000100		
RB_MP_M_HCE	= 00004000		
RB_MP_M_HO	= 00000010		
RB_MP_M_MRK	= 00000001		
RB_MP_M_PLGV	= 00000200		
RB_MP_M_RST	= 00000008		
RB_MP_M_SPD	= 00000800		
RB_MP_M_STS	= 00000002		
RB_MP_M_VC	= 00000200		
RB_MP_M_WDE	= 00008000		
RB_MP_M_WGE	= 00000400		
RB_MP_V_PLGV	= 00000009		
RB_MP_V_VC	= 00000009		
RB_MP_V_WGE	= 0000000A		
RB_MP_V_WL	= 0000000D		
RB_MP_V_WTP	= 0000000D		
RB_NUM_REGS	= 00000007		
READDATA	000001FD	R	03
READHEAD	000001F6	R	03
READTRACKD	000001E7	R	03
RECAL	000001F0	R	03
RECALB	000003E6	R	03
RELEASE	000001E7	R	03
RESETDRIVE	000002B8	R	03
RETCENTER	000001E7	R	03
RETHDR	000005BA	R	03
RETREG	000006B0	R	03
RETRY	00000728	R	03
RETRYERR	000002AA	R	03
SEEK	000001F0	R	03
SEEK1	00000444	R	03
SIZ...	= 00000020		
SPECOND	00000672	R	03
SS\$_CTRLERR	= 00000054		
SS\$_DATACHECK	= 0000005C		
SS\$_DRVERR	= 0000008C		
SS\$_MEDOFL	= 000001A4		
SS\$_NORMAL	= 00000001		
SS\$_PARITY	= 000001F4		
SS\$_TIMEOUT	= 0000022C		
SS\$_VOLINV	= 00000254		
SS\$_WASECC	= 00000639		
SS\$_WRITLCK	= 0000025C		
STARTSPNDL	000001E7	R	03
SUCCESS	0000073C	R	03
TRANSFER	00000221	R	03
UBISL_MAP	= 00000800		
UCB\$B_CEX	= 00000093		
UCB\$B_DEVCLASS	= 00000040		
UCB\$B_DEVTYPE	= 00000041		
UCB\$B_DIPL	= 0000005E		
UCB\$B_DQ_FLAGS	= 000000C9		
UCB\$B_ERTCNT	= 00000080		
UCB\$B_ERTMAX	= 00000081		
UCB\$B_FEX	= 00000092		
UCB\$B_FIPL	= 0000000B		
UCB\$B_SECTORS	= 00000044		

UCB\$B_TRACKS	= 00000045
UCB\$B_DQ_LEN	= 000000FA
UCB\$B_LCC_DISK_LENGTH	= 000000CC
UCB\$B_CRB	= 00000024
UCB\$B_DEVCHAR	= 00000038
UCB\$B_DEVCHAR2	= 0000003C
UCB\$B_DEVDEPEND	= 00000044
UCB\$B_DPC	= 0000009C
UCB\$B_DQ_BA	000000D0
UCB\$B_DQ_BC	000000D4
UCB\$B_DQ_CS	000000CC
UCB\$B_DQ_CURDA	000000F2
UCB\$B_DQ_DA	000000D8
UCB\$B_DQ_DPR	000000E8
UCB\$B_DQ_FMPR	000000E0
UCB\$B_DQ_MP	000000DC
UCB\$B_DQ_PMPR	000000E4
UCB\$B_DQ_PREVDA	000000F6
UCB\$B_FPC	= 0000000C
UCB\$B_FR3	= 00000010
UCB\$B_IRP	= 00000058
UCB\$B_MAXBLOCK	= 000000B0
UCB\$B_MEDIA	= 000000BC
UCB\$B_MEDIA_ID	= 0000008C
UCB\$B_SVAPTE	= 00000078
UCB\$B_DIAGBUF	= 00000002
UCB\$B_DQ_DIP	= 00000002
UCB\$B_DQ_ECC_DEFER	= 00000004
UCB\$B_DQ_SIP	= 00000001
UCB\$B_ECC	= 00000001
UCB\$B_NOCNVRT	= 00000004
UCB\$B_ONLINE	= 00000010
UCB\$B_POWER	= 00000020
UCB\$B_TIMEOUT	= 00000040
UCB\$B_VALID	= 00000800
UCB\$V_DIAGBUF	= 00000001
UCB\$V_DQ_DIP	= 00000001
UCB\$V_DQ_ECC_DEFER	= 00000002
UCB\$V_DQ_SIP	= 00000000
UCB\$V_ECC	= 00000000
UCB\$V_INT	= 00000001
UCB\$V_POWER	= 00000005
UCB\$V_VALID	= 0000000B
UCB\$W_BCNT	= 0000007E
UCB\$W_BCR	= 000000C0
UCB\$W_BOFF	= 0000007C
UCB\$W_CYLINDERS	= 00000046
UCB\$W_DA	= 000000BC
UCB\$W_DC	= 000000BE
UCB\$W_DEVBUFSIZ	= 00000042
UCB\$W_DEVSTS	= 00000068
UCB\$W_DQ_HDR1	000000EC
UCB\$W_DQ_HDR2	000000EE
UCB\$W_DQ_HDR3	000000F0
UCB\$W_ECT	= 000000C4
UCB\$W_EC2	= 000000C6
UCB\$W_FUNC	= 0000009A

DQDRIVER
Symbol table

G 16
- VAX/VMS RB730:RB02/RB80 DISK DRIVER

15-SEP-1984 23:49:22 VAX/VMS Macro V04-00
5-SEP-1984 00:12:46 [DRIVER.SRC]DQDRIVER.MAR;1

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(1)

UCBSW_OFFSET	=	000000C8		
UCBSW_STS	=	00000064		
UCBSW_UNIT	=	00000054		
UNLOAD		000001E2	R	03
UPDATE		00000605	R	03
VECSB_DATAPATH	=	00000013		
VECSB_NUMREG	=	00000012		
VECSL_ADP	=	00000014		
VECSL_IDB	=	00000008		
VECSL_INITIAL	=	0000000C		
VECSL_UNITINIT	=	00000018		
VECSS_MAPREG	=	0000000F		
VECSV_MAPLOCK	=	0000000F		
VECSV_MAPREG	=	00000000		
VECSV_PATHLOCK	=	00000007		
VECSW_MAPREG	=	00000010		
WRITECHECK		000001F6	R	03
WRITECHK		000005EE	R	03
WRITEDATA		000001FD	R	03
WRITEHEAD		000001F0	R	03
WRITETRACKD		000001E7	R	03
XFER		000004DA	R	03
_TMP\$VAL	=	00000044		

! Psect synopsis !

PSECT name	Allocation	PSECT No.	Attributes														
. ABS .	00000000 (0.)	00 (0.)	NOPIC	USR	CON	ABS	LCL	NOSHR	NOEXE	NORD	NOWRT	NOVEC	BYTE				
\$AB\$\$	000000FA (250.)	01 (1.)	NOPIC	USR	CON	ABS	LCL	NOSHR	EXE	RD	WRT	NOVEC	BYTE				
\$\$\$105_PROLOGUE	00000082 (130.)	02 (2.)	NOPIC	USR	CON	REL	LCL	NOSHR	EXE	RD	WRT	NOVEC	BYTE				
\$\$\$115_DRIVER	00000A32 (2610.)	03 (3.)	NOPIC	USR	CON	REL	LCL	NOSHR	EXE	RD	WRT	NOVEC	LONG				

! Performance indicators !

Phase	Page faults	CPU Time	Elapsed Time
-----	-----	-----	-----
Initialization	31	00:00:00.05	00:00:01.69
Command processing	115	00:00:00.36	00:00:05.99
Pass 1	634	00:00:20.22	00:02:22.64
Symbol table sort	0	00:00:02.57	00:00:14.43
Pass 2	387	00:00:04.98	00:00:31.10
Symbol table output	22	00:00:00.21	00:00:01.35
Psect synopsis output	0	00:00:00.02	00:00:00.02
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	1191	00:00:28.41	00:03:17.22

The working set limit was 2550 pages.
166368 bytes (325 pages) of virtual memory were used to buffer the intermediate code.
There were 130 pages of symbol table space allocated to hold 2370 non-local and 86 local symbols.
2248 source lines were read in Pass 1, producing 23 object records in Pass 2.
58 pages of virtual memory were used to define 55 macros.

! Macro library statistics !

Macro library name	Macros defined
-----	-----
\$255\$DUA28:[SYS.OBJ]LIB.MLB;1	33
\$255\$DUA28:[SYSLIB]STARLET.MLB;2	11
TOTALS (all libraries)	44

2514 GETS were required to define 44 macros.

There were no errors, warnings or information messages.

MACRO/LIS=LIS\$:DQDRIVER/OBJ=OBJ\$:DQDRIVER MSRC\$:DQDRIVER/UPDATE=(ENHS:DQDRIVER)+EXECMLS/LIB

0109 AH-BT13A-SE
VAX/VMS V4.0

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